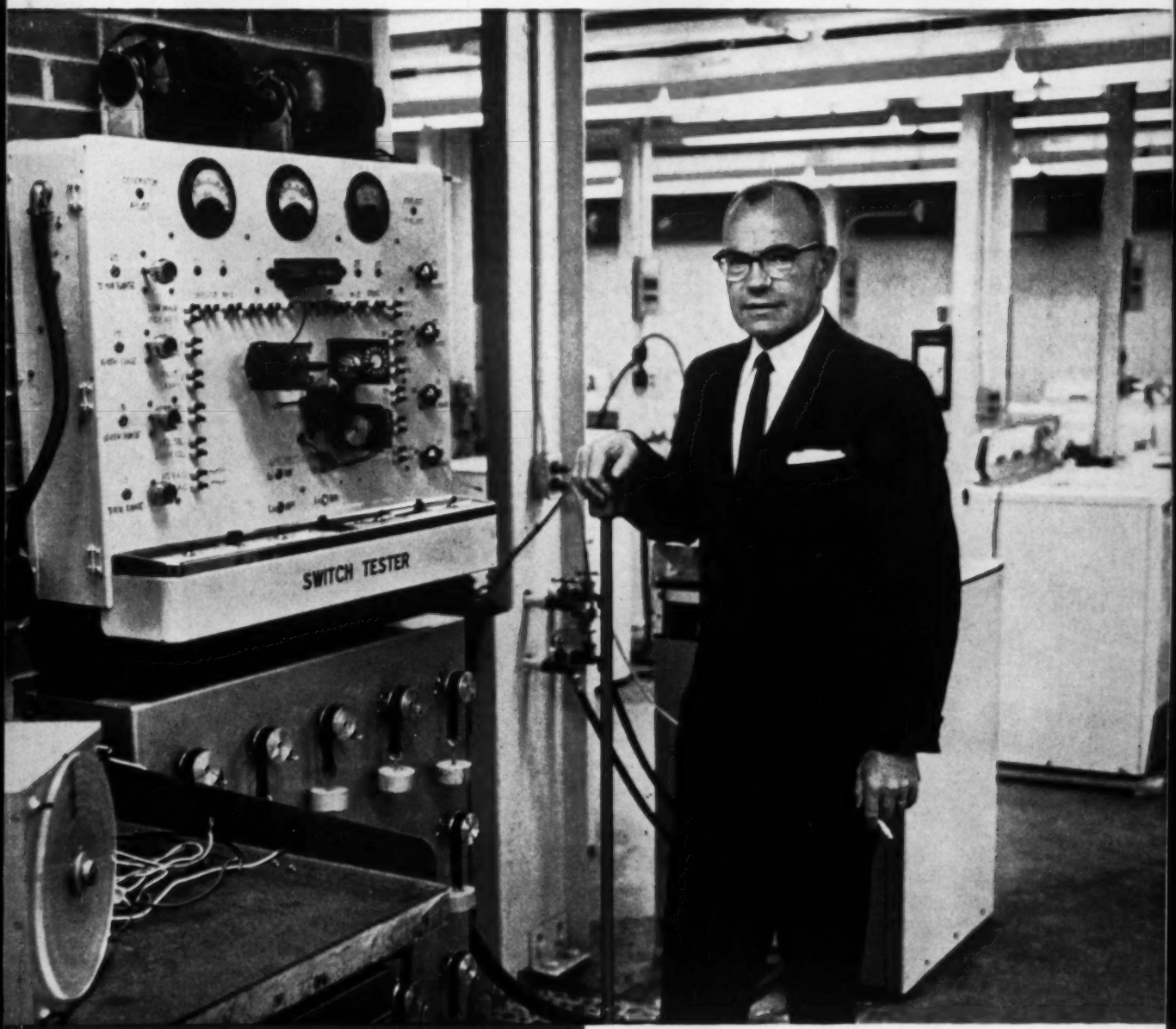
IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication NOVEMBER 2, 1961



* Maytag President, Fred L. Maytag II:

Quality Control Builds A Company Image p. 69

New Measures for Plant Safety? p. 41

Packaged Plants for Export p. 46

Digest of the Week p. 2-3

250,000 full turns, more than a lifetime of service, and the amount of wear on ratchet drive lugs, or tangs, is practically unnoticeable. Corners remained sharp and clean and the surface unmarred.

What kind of steel does New Britain specify for these vital parts? What kind of steel offers this combination of high torque strength, high surface resistance to wear and Brinelling, plus uniform machinability? An alloy steel, of course . . . Aristoloy 4150 to be specific.

Write today for complete information about Aristoloy alloy steels in leaded and unleaded grades. Ask for Product and Facilities Catalog or call your nearest Copperweld representative.

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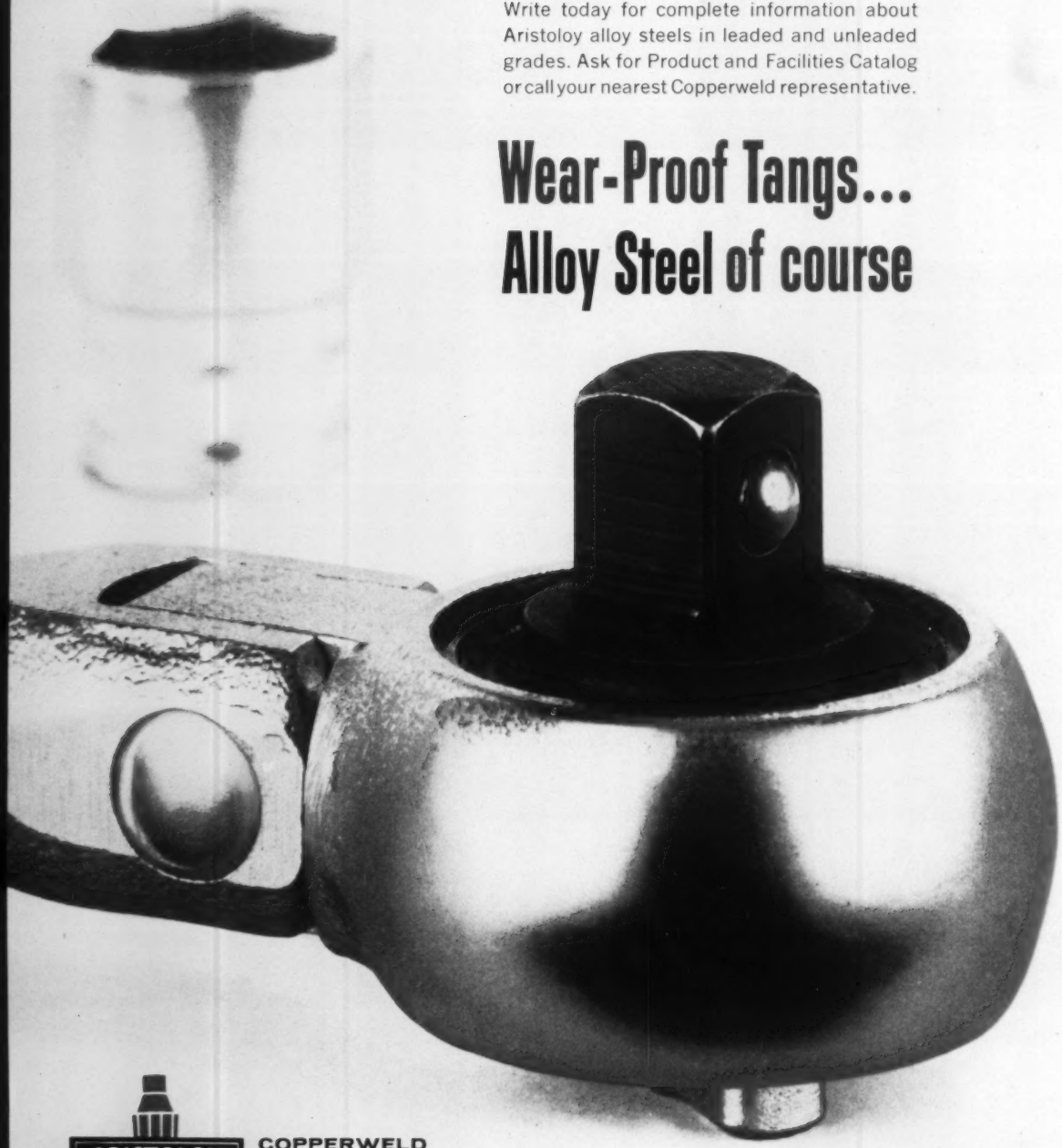

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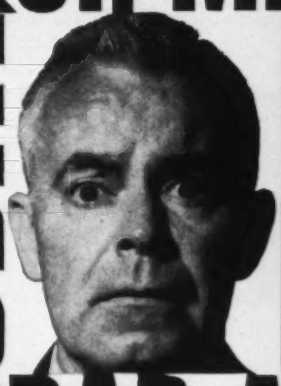
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If you buy steel in small or moderate lots, there's a good chance the final cost of service-center steel (processed or not) will be lower than the final cost of steel you buy from a mill and keep in inventory.

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Steel Service Centers from coast to coast stock top-quality Bethlehem structurals, sheets, plates, bars, tool steels, and alloy steels. And you get fast delivery.

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IRON AGE

November 2, 1961—Vol. 188, No. 18

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Digest of the Week in Metalworking

News of the Industry

Accident Costs Climb: Plants seek new ways to assess safety drives. 41
Administration Woos Business: Leaders cautious to new harmony line. 43
ASM Tackles Talent Shortage: Technical people needed at all levels. 45
Packaged Plants Go Abroad: New nations adopt ready-made businesses. 46
Report from Japan: Stepped-up trade sought, but not with Red China. 48

Engineering-Production Developments

Is Quality Control Your Problem?: A direct approach is often best. 69
Planned Annual Retooling Pays Off: Boosts efficiency, pares costs. 72
Bimetal Sheets Simplify Welding: Provide steel-aluminum transition. 74
Half-Size Prints Offer Savings: Reduced drawings cut paperwork. 76
Explosives Shape Solar Mirror: Device will capture sun's energy. 79
Tiny Crystals "Cage" Catalyst: Result is a one-can epoxy resin. 80
Fastener System Takes Big Loads: Steel bolts rate at 300,000 psi. 82

Markets and Price Trends

Semiconductors Seek Markets: Stable, non-military sales are target. 44
New Rules Aid Exporter?: Short-term credits, insurance come easier. 47
Steel Summary: Strike hedging to tighten market. 105
Bearings Buyers Eye Space: New market calls for new buying talents. 106
Nonferrous: Brass mills on plateau; little sales change likely. 112

Editorial

It Is Too Late To Use the Messenger Boys! 5

Metalworking Newsfront

Business Forecast 7
Metalworking Labor 9
Washington 11
International 13
Techfront 15
Market-Planning Digest 51
Report to Management 55
Spacefront 67
Steel Summary 105

Industry Trends

Automotive 57
West Coast 58
Machine Tools 59
Purchasing 106

Markets and Prices

Price Section 105
Steel Products 108
Ferrous Scrap 110
Nonferrous 112

Departments

Letters 17
Fatigue Cracks 21
Meetings and Exhibits 23
Industrial Briefs 52
Men in Metalworking 60
New Patents 84
Technical Literature 87
Design Digest 89
New Equipment 96
Clearing House 122

ADVERTISING INDEX 126

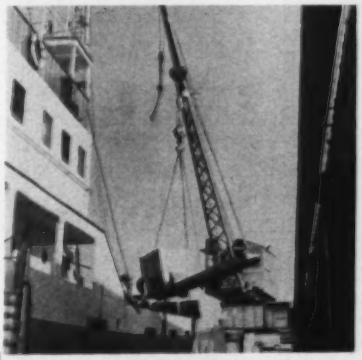
Special This Week

Reliable Products Generate Prestige

Every company wants a reputation for quality, but it's easier said than done. From Fred L. Maytag II, chief executive of the Maytag Co., comes a suggestion: "Why not meet the problem head on?" And this week's cover story does just that. It deals with a direct approach to the quality control problem. p. 69

Industry Accidents Grow More Costly

Industry's record in reducing accidents is encouraging. But the severity of accidents and losses through disability are rising. This year plant accidents will cost $2.2 billion. Search is on for new ways to measure safety programs. p. 41



Packaged Plants: New Market Abroad

Ready-made plants have aroused new interest in South America, Africa and many other developing nations. It's a return to the U. S. way: Small business first, then big business, finally heavy industry. Russia's "heavy industry first" is losing favor. p. 46

Next Week

Truck Engineers Fight Costly Weight

Truck engineers know that ounces of weight mean dollars of payload. As a result, it's a constant battle against weight, with new materials and processes as ammunition. Next week's Special Report tells how this battle is shaping up.

Tom Gilbert shifts gears 675 times a day and likes it. Operating a new Warner & Swasey No. 5 Turret Lathe, Tom dials the proper speed on the Preselector, then flicks the lever and gets an instant automatic shift. He gives his employer, John N. Martin, Manufacturer, 50% higher output than possible on older turret lathes in the shop. The **Warner & Swasey** Company, Cleveland.

It Is Too Late To Use the Messenger Boys!

The Administration is moving to win public confidence on its foreign policy. Some of its messenger boys are talking to learned societies and other high-level organizations. Others are talking to businessmen's groups, students and various associations.

They had better spare themselves. The public relations approach will not work with the people. Even if the technique were good—which it isn't—it would not work.

The ordinary person, in Bath, N. Y., Milwaukee, Philadelphia, Genoa City, Wis., or Anchorage, Alaska, does not want excuses or brainwashing. He wants action, maturity from leaders, and the "word" from the President himself.

Blaming the newspapers and partisanship and talking about a "mature" policy—as one of the Administration's boys did at Binghamton, N. Y., recently—is so much gobbledegook. And what's more, an Administration which prides itself on its closeness to the people should know better than to send these people out into the country when our world is cracking up.

The people want to hear from President Kennedy. Any school kid knows that the foreign policy of the United States stems from the President. No one else can take his place. No others will be listened to when they attempt to inform the "public."

The people don't want a press-agentry job. They are being snowed enough from other quarters. What they want is reassurance from their Commander-in-Chief that our losses in Laos, in Cuba, in West Berlin—and maybe soon in South Vietnam—are not the patterns we are to expect in the future.

They want to know why we have frittered away our time while Russia has made and completed important nuclear tests. They want to know why we are championing a ban when we are far behind because we haven't been testing adequately.

The people—all of them—want to hear from the President just how serious this thing is. The newsmen, the columnists and the commentators must try to tell the people because many of the President's glamour boys have been practicing the complex job of communications.

The people want action, maturity, and the blunt truth from the President. He can send the messenger boys home. They won't do a bit of good—based on their performance to date. Besides, it's too late for them!

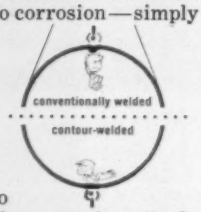
Tom Campbell

Editor-in-Chief

"The Gravity Kid" shows how

CONTOUR-WELDED STAINLESS TUBING DEFIES CORROSIVE ATTACKS

It's smoother inside than any other tubing—welded or seamless—because the patented* Contour-welding process virtually eliminates the weld bead. And this smoother surface ensures greater resistance to corrosion—simply because there are fewer focal points for corrosive attack.



You see, in conventionally welded tubing, gravity pulls the molten metal down into the tubing. This forms a bead that is difficult to remove by cold working. And cold working can lead to undercuts that become focal areas for corrosive attack.

Contour-welded tubing, however, is welded at the bottom. Gravity still pulls the molten metal down. But now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam closely conforms to the tubing contour.

Contour-welded tubing is smoother, too, than seamless. That's because it's formed from uniformly rolled strip steel whereas seamless is extruded from a billet.

But get full details on this corrosion-resistant tubing. Send for our free 48-page manual on Contour-welded tubing in sizes from 1/8" to 40" O.D.—in stainless and high alloy steels, titanium, zirconium, zircalloy and Hastelloy.**

*U.S. Patent 2,716,692

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1962: Good News For Business

A survey of 316 of the nation's leading economists shows a consensus forecast that "all major indicators of the economy will advance in 1962." They see many of the indicators going to record levels in the coming year. The survey was done by F. W. Dodge Corp.

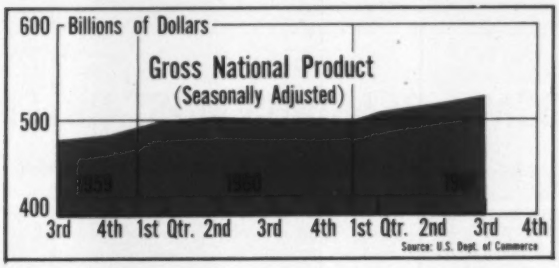
The economists predict that industrial production will rise by almost 10 pct between now and December, 1962. And they feel this recovery will be centered in durable goods manufacturing.

Some of their warnings for 1962: Some inflation, tougher foreign competition, high jobless level.

As GNP Goes, So Goes Profits

Corporate profits rose $5.5 billion in the second quarter to $45.5 billion at an annual rate. And third quarter profits should go higher. This is true if a profit gauge used by Commerce Secretary Luther H. Hodges works.

In a recent speech, Mr. Hodges pointed out that



corporate profits usually increase "at a ratio of about $2 billion for each $25 billion increase in GNP."

GNP rose more than $15 billion from the first to second quarters to $516.1 billion. The corporate profit rise for the period reflects this GNP rise.

Preliminary data shows third quarter GNP at $526 billion. And Mr. Hodges forecasts a year-end level of $540 billion.

Relief Pattern Shapes Up

If there is to be priority on help for business from Washington, it is now clear what industries will get help first—and in greatest measure.

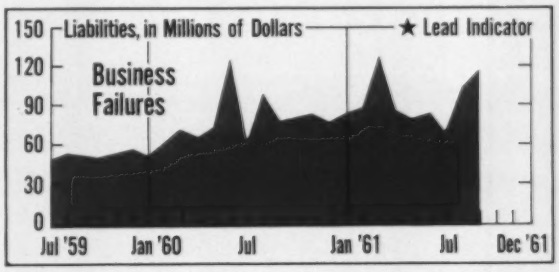
The textile industry, one of the hardest hit by foreign competition, was first to get eased depreciation. There was no caprice in this selection.

Economically, the big concern of the Administration is growth. And the biggest promise here is in more world trade. Industries that show least ability to compete in world trade will get boosts first.

During the past three years, the U. S. has rolled up a deficit of more than $11 billion in international accounts. Exports are counted on to turn this tide.

Business Casualties Ease Off

Business failures fell 20 pct in September from August to 1285. Dollar liabilities, however, rose to $116.7



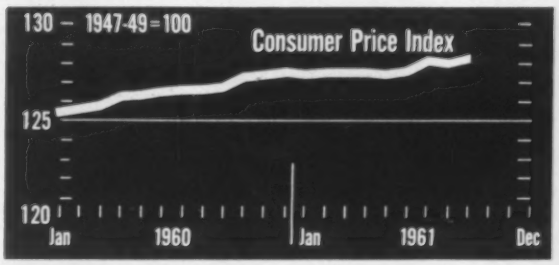
million, up from $102.7 million in August. But one failure with a whopping $40 million in liabilities tilted the figures for the month. With this exception removed, losses would be off a third from August.

Fewer manufacturing companies failed in September than in the previous month. And the metals and machinery industries, hard hit in August, showed up favorably.

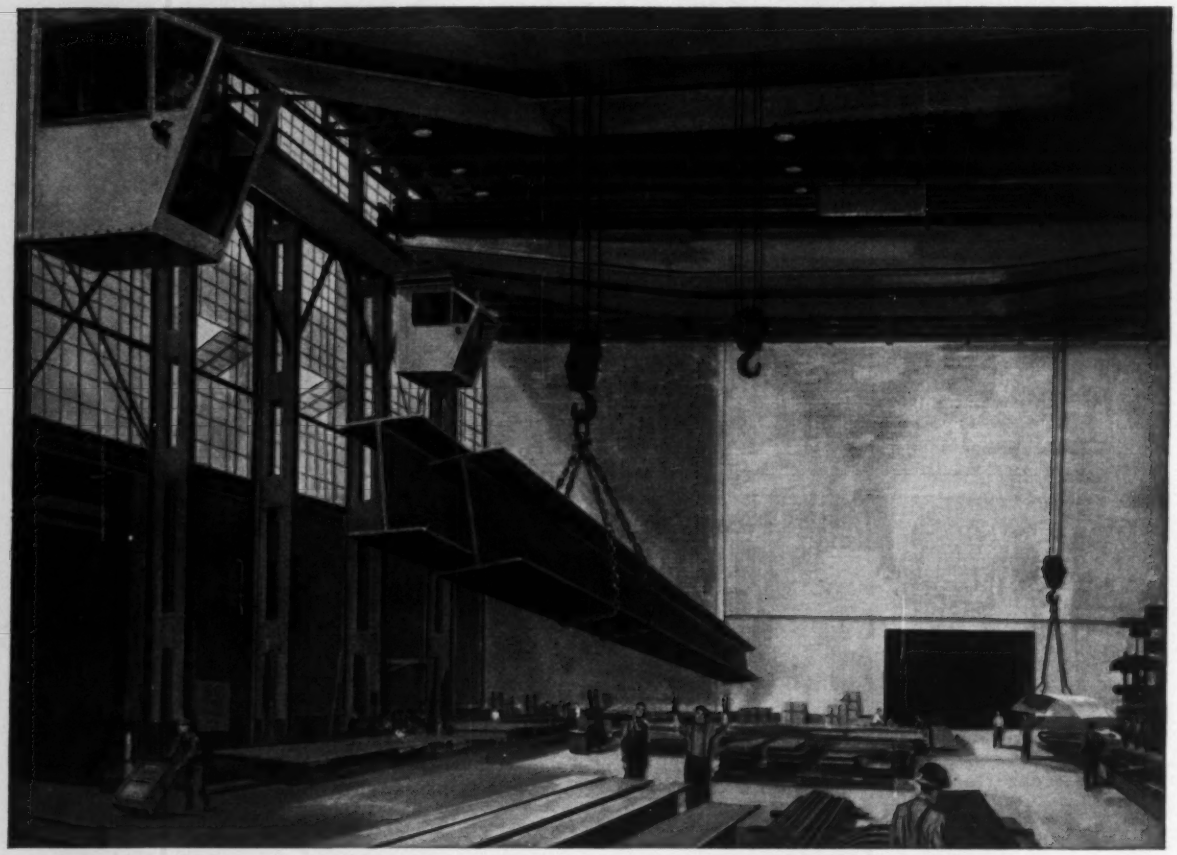
Consumer Prices Move Up

The cost of living, as measured by the Labor Dept's. consumer price index, rose 0.3 pct from August to September. This places the index at a record high of 128.6. But Labor Dept. officials see no shadows of a coming inflationary spiral.

Most price hike pressures in September came from clothing, rents and consumer services. In hard goods lines only used autos showed upward pressures.



One note of hope in the rising price picture: People may be spurred into buying. Savings, now at record levels, may not seem so reassuring when measured against rising prices. Savings buy less as prices rise.



TONS TO MOVE...SCHEDULES TO BEAT...BEARINGS MUST ROLL!

When the push is on, plant equipment must move at top speed. There's no time for machinery to act up, require excessive maintenance. That's why industry after industry relies on the bearing performance they've learned they can take for granted —Bower Roller Bearings for the heavy industrial machinery they make or operate. Bower-developed design advantages plus painstaking precision control reduce bearing failure and maintenance to an absolute minimum. What's more, the built-in durability of Bower bearings helps keep machinery operating at peak efficiency, even under the most rugged conditions. For *your* bearing requirements—for new equipment or for replacement – choose from Bower's complete line of tapered, cylindrical or journal roller bearings. Bower Roller Bearing Division, Detroit 14, Michigan.

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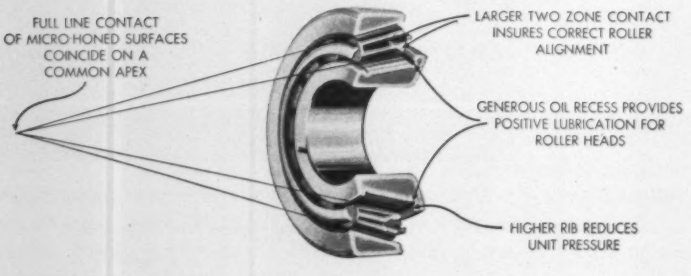
FULL LINE CONTACT OF MICRO-HONED SURFACES COINCIDE ON A COMMON APEX
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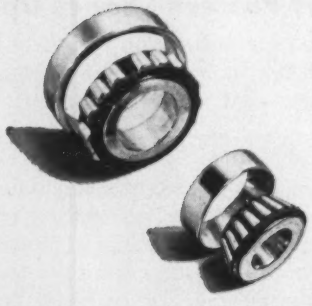
GENEROUS OIL RECESS PROVIDES POSITIVE LUBRICATION FOR ROLLER HEADS
HIGHER RIB REDUCES UNIT PRESSURE



Neutrals Not Needed, USS's Larry Says

There is little buildup of sentiment in the steel industry for more public participation in labor problems.

This was made clear last week by R. Heath Larry, administrative vice president, labor relations, of U. S. Steel. Mr. Larry, of course, was a key figure in the 1959 steel negotiations. He also will have a major part in the 1962 steel labor contract negotiations.

In an address in Texas, Mr. Larry made it clear how he feels about agreements, such as that existing between Kaiser Steel and the Steelworkers, where "public" members are involved.

He raised this question: Have the problems present in collective bargaining become too big to be handled by the private parties to the bargaining?

"There has been much speculation about third parties—so-called informed neutrals—might be used by voluntary means," he remarked.

"It might be most helpful if the so-called informed neutrals were to spend less time predicting that the unhappy state of collective bargaining affairs will require more and more of their direct participation in bargaining in order to produce sensible results; and rather were to spend more of their time using their existing and unfettered positions of influence and responsibility to help develop the basic atmosphere of understanding which might dissipate the problems which some of them now foresee as making their participation desirable."

Does Minimum Wage Help, or Hurt?

Opponents of the expanded minimum wage law are beginning to criticize the law in action.

Rep. Carroll B. Kearns, R., Pa., says the new minimum wage law cost some low-paid workers their jobs in its first weeks of operation. He cited cases in states of Kansas, Texas, and Mississippi.

REP. KEARNS: "It hurts the little fellows we're trying to help."

Rep. Kearns, senior Republican on the House Labor Committee, says those who are being hurt most are "the little fellows . . . the very ones President Kennedy promised the law would help."

NLRB Predicts Speedier Elections

The time required to hold representation elections has been cut in half during the past three years and it's going to get better.

That's the forecast of the National Labor Relations Board's General Counsel Stuart Rothman. He said an average of 30.3 days were needed the year to produce reports on objections and challenges to elections, compared with 63.5 days in 1958.

Reason: Increased willingness to bypass hearings.

Section 14 (b): After It Again

Anyone who has ever negotiated a labor contract or took a serious look at labor problems knows what **14(b)** means.

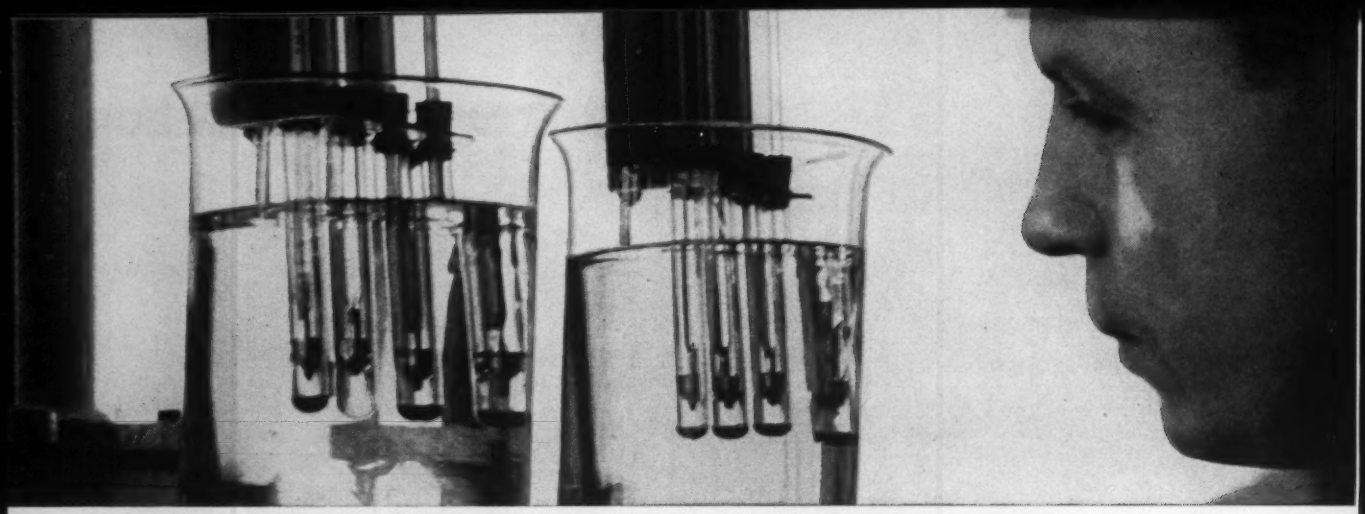
It's the clause in the National Labor Relations Act that permits states to enact so-called right-to-work laws. It has always been a prime target of labor unions. Now, it has taken on even more stature.

Last week the National Right-to-Work Committee and some 200 delegates met in Chicago for a seminar that took on surprising significance. The right-to-work group has suffered some defeats in the polls and had been considered by many to be a waning force. But not so as indicated in Chicago.

Rep. P. M. Landrum, co-author of the Landrum-Griffin Act, warned the group that 14(b) would be again the major legislative target of organized labor.

"Make no mistake," the Georgia Democrat said. "Those who oppose these laws, whose excesses were checked by their enactment, are working constantly for their repeal. Failing to repeal, they will bend every effort to regain some of the special privileges and advantages which these laws deny them."

Recent developments of interest to the group: The National Labor Relations Board decision on the "agency shop" and the Kansas decision of the state Supreme court not to review the state's right-to-work law. In other words, a standoff in legal developments.



Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from left) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

Because of Microgel, Darina has no melting point. It won't run out of gears or bearings.

Compared with most conventional soap-base greases, Darina provides significantly greater protection under adverse service conditions.

Mix water into Darina and the grease does not soften. It shrugs off water—won't emulsify.

Resists heat

Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

Also, Darina resists slumping, thus forming a more effective seal against foreign matter.

Saves money

Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

In some cases lubrication intervals have been extended to double what they were before. Less grease is consumed and less time consumed applying it.

For details, see your Shell Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

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SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are helping to provide better products for industry

★Deficit Means Spending Cut

Faced with a Federal deficit of nearly $7 billion, President Kennedy will rely on government belt-tightening and the "recuperative force" of private enterprise for economic stability.

The Administration forecast the deficit in a budget review this week. The fiscal year ending next June 30 is expected to show a deficit of $6.9 billion. Expenditures for fiscal 1962 are estimated at $88,985,000,000, while receipts will be $82,100,000,000.

The deficit forecast is $1.6 billion bigger than the $5.3 billion estimate after the Berlin crisis last July. It is $4.1 billion bigger than Pres. Kennedy's original $2.8 estimate and $5.4 billion higher than former President Eisenhower's $1.5 forecast for the same year.

The higher deficit is blamed on bigger outlays for defense, space programs, agriculture, and government operations and on lower revenues.

To slim this deficit, the President says he intends to spend "substantially less" than Congress authorized. He urged all government departments to cut down all spending "not absolutely necessary to the national interest at this time."

Despite the deficit, the President still plans to submit a balanced budget for fiscal 1963. He expects a substantial increase in revenue next year under existing tax laws.

But military and other national security expenses will go up. (Administration officials warn military spending could increase even before 1963.) Therefore, the President says, it will be necessary to defer many federal programs which normally would be desirable. Other programs would be curtailed.

■ Congress in Uproar At U. S.-Soviet Trade

Committees from both Houses of Congress are raking U. S. exports to the Communist bloc over the coals. Heavy emphasis is being put on shipments of machine tools.

The outcome of between-session Washington hearings may be legislation for new and stricter control on shipments to the Soviet bloc.

Sen. Kenneth B. Keating (R., N. Y.), calls for such revisions in the Export Control Act when it comes before Congress next year.

Sen. Keating, heading hearings of the Senate Internal Security Subcommittee, said the time has come when a "total embargo of trade with the Soviets may have to be considered. We know the Soviets do not have the technological know-how in certain machine tool fields." He called for a total embargo on all machine tool shipments to the Soviet bloc.

Meanwhile, a special House committee, headed by Rep. A. Paul Kitchen (D., N. C.), heard testimony from top cabinet officials on U. S. exports to Russia and its satellites.

Commerce Secretary Luther Hodges told the committee the Administration is taking a closer look at exports to the Communist bloc.

■ Budget Bureau Buildup Advised

The Senate committee on national policy machinery has finished its job. The committee, headed by Sen. Henry M. Jackson (D., Wash.), has completed the last of its studies on how to make U. S. policy more effective.

The final study recommends making the U. S. Budget Bureau stronger. This is contrary to the views of many congressmen who feel the bureau is too strong now. The committee says the budget bureau is the President's strongest instrument for an effective national policy, because it works through the "pocketbook."

Previous studies by the committee included these recommendations:

1. Let the Secretary of State handle more matters of foreign policy.
2. Discard the idea of a "first secretary" to the President.
3. Overhaul the conflict-of-interest laws so top men won't have to make large financial sacrifices to take government jobs.
4. Set up a White House agency for science.

■ Defense Budget Nears $50 Billion

Defense Dept. sources indicate next year's military budget will reach the $50 billion mark. It will be a big jump from this year's $46.6 billion allotment.

The increase—if Congress allows it—is slated mainly for continued limited war buildup. This is in line with present Administration thinking, which puts emphasis on preparedness for a Korean-type war as well as building a big missile force.

New funds are planned for another Navy super aircraft carrier and modern vehicles to make the Army more mobile.

Army, Navy and Air Force budget requests may amount to a total over $52 billion. But the Pentagon will have to do some trimming to keep the Administration happy.

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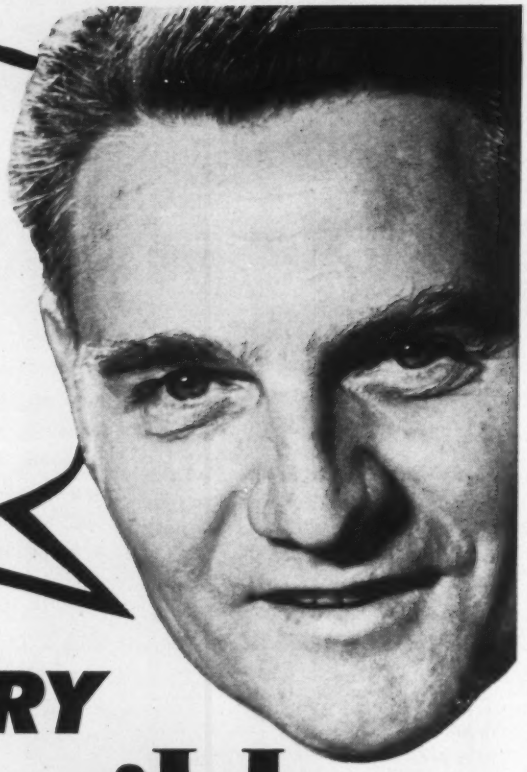

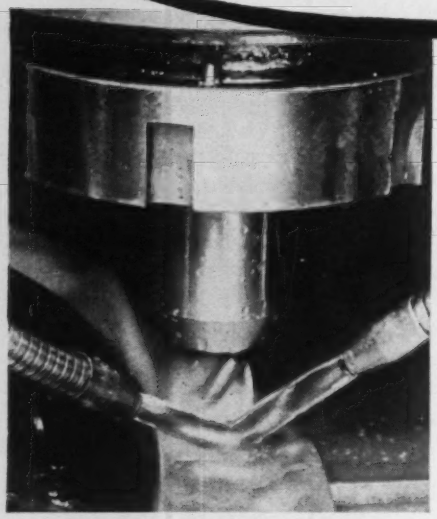

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3. PREVENTS RUST. Even in hot, humid weather it protects parts against rust to eliminate costly cleaning.

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5. IMPROVES PRODUCTION by providing better finishes and reducing rejects. Work stays cool, clean and visible.

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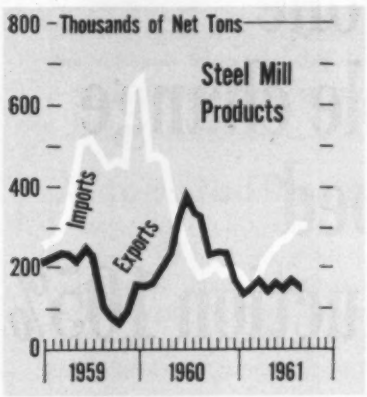
Steel Exports Drop As Imports Climb

Imports of steel mill products to the U. S. rose in August for the seventh straight month. But exports



dropped, the Commerce Dept. reports.

At the August rate, 1961 steel exports would total only 1.8 million tons, compared with 3 million tons in 1960. This would be the lowest (excluding 1959's strike-influenced 1.7 million tons) since 1938.

Sharp decline in U. S. steel exports is due to a number of factors. Steelmaking capacity abroad, especially Western Europe and Japan, has seen unprecedented growth. Many countries now have more steel available for export. Also, Western European and Japanese producers can sell many products at lower prices, due to a flexible export pricing policy geared to market conditions.

Canada is no longer the principal market for U. S. mill products. A major portion of sales has been lost with increased Canadian production.

Another big factor: World oil drilling and pipeline construction has declined. More new pipeline facilities are being completed abroad.

Western Europe and Japan made biggest gains in world steel markets during the long 1959 steel strike. They have consolidated these advances and are surging forward on the world-wide steel front.

Exports of U. S. steel mill products in August totaled 150,000 tons. This is 19,000 tons under July's output, and less than half of the sales abroad a year ago. The total for the first 8 months was 1.2 million tons, compared with 2.1 million tons in the same period of 1960.

August steel imports totaled 307,000 net tons, about 7000 tons higher than July and 124,000 tons more than in August, 1960.

This is the highest import total since April, 1960, and brings the eight-month total to 1.9 million tons. Imports during the first eight months of 1960, strongly affected by 1959 steel strike orders, totaled 2.5 million tons. If imports continue at the same pace, they will equal the 3.3 million tons imported in 1960.

Japanese Trade Tip: Slowup Is Temporary

U. S. exporters are advised not to be misled by the new Japanese slowdown.

Sources in Tokyo say the condition is temporary. In about a year the climate will be different. And if U. S. traders back away, interests in other countries will move in.

West Germans, British, Russians and Scandanavians are all trying to get a stronger foothold in Japan's trade. They will succeed if Americans, wary of this slowdown, neglect to protect their p sitions. To keep business and get new trade, U. S. companies must invest more men, money, time and information.

Japanese companies are looking ahead and U. S. traders must follow them. As soon as imbalance of international payments straightens out, Japanese recovery will rebound.

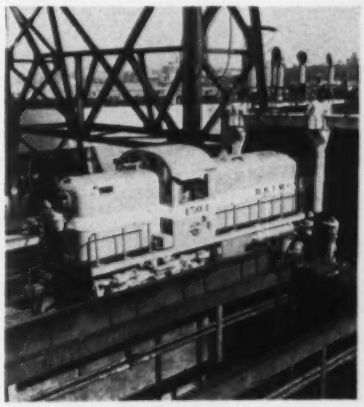
Railroads Shipped To African Mines

A ship carrying two complete railroads is moving towards Africa. Seatrain Lines, Inc., Edgewater, N. J., is handling the unusual shipment, bound for one of the world's richest iron ore deposits.

The shipment includes a dozen locomotives, 195 special railroad cars and hundreds of tons of rail and track. It will be used in the $200 million Lamco project, joint venture of U. S. and Swedish interests and the Liberian government.

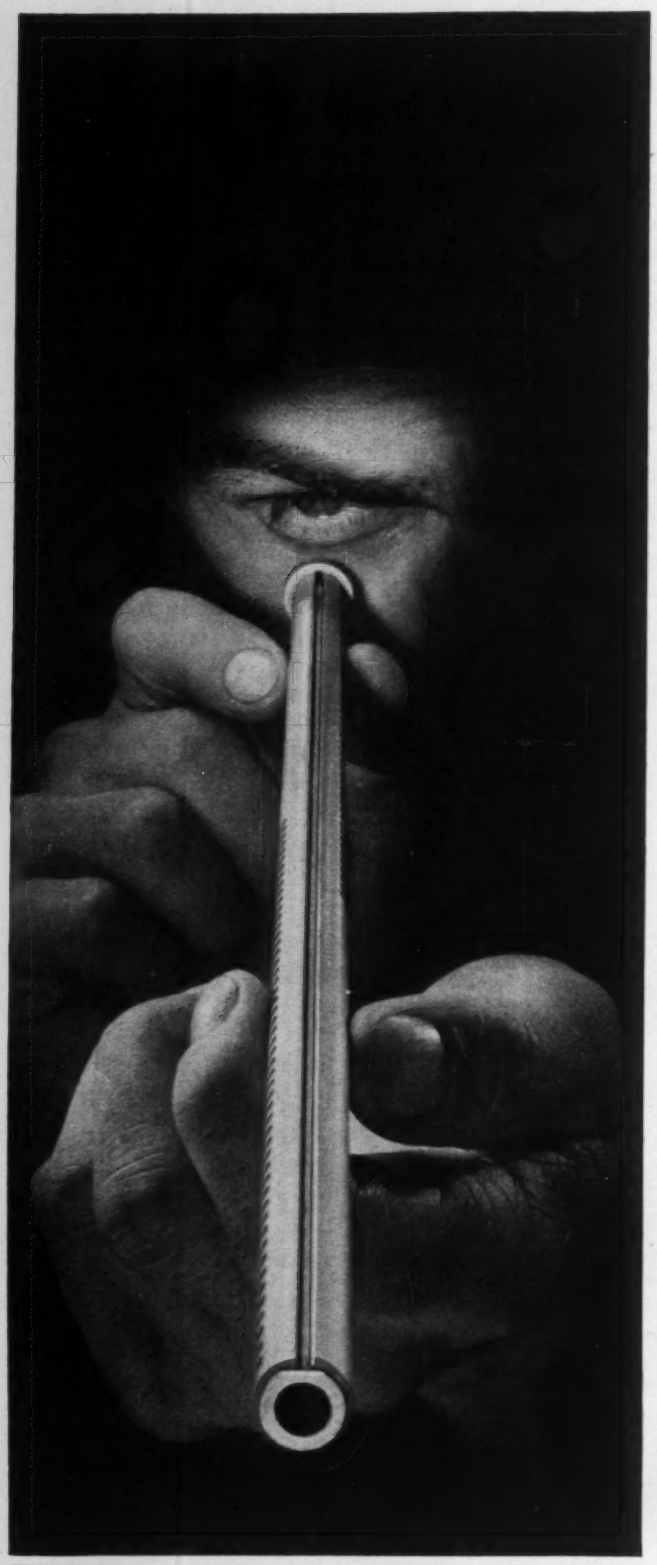
Raymond International, Inc., New York construction company, chartered the ship. It holds a $49 million contract with Lamco. Raymond will use one railroad to build a new ocean port, the other to construct a 165-mile-long railroad to Liberia's remote Nimba Mountains, site of the ore deposits.

The $2 million shipment consists of 207 separate pieces of railroad equipment.



ALL ABOARD: Seatrain loads up.

Nimba range has been assayed as having 235 million tons of proven quantities of high quality ore, and 500 million tons of reserve. Initial production is estimated at 6 million tons per year, most of which will go to Western Europe and the U. S.



how one simple change jumped production 105%

Look at the long slot that runs the length of this typewriter adapter shaft. It was giving Standard Register Co. a costly production headache. Tubing used could only be milled at 7½" per minute. Finish was poor. Warping and twisting ran rejects to 25%.

Then Ryerson studied the situation and suggested a change in material—to Ledloy® 170 tubing. Using the same tooling, Standard now mills 15½" per minute—more than double former production. And rejects dropped to zero—the slot is smooth and straight as a die. See for yourself.

How about you? Shouldn't you invite this kind of close look at the material in your products, equipment and plant? A Ryerson specialist may well help you boost production and cut costs in some ways you never thought of. Metalogics is like that.

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METALOGICS

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Hand in hand with the increase of research and development programs in the U.S., technology is forging ahead to produce new and better metalworking techniques. Nowhere was this more in evidence than at last week's ASM Metal Show in Detroit's Cobo Hall. Reported below are some of the top new ideas unveiled in the technical sessions, plus some interesting new products.

Automated Plasma Welding

Watch for the debut of mechanized "Plasmarc" welding. To date, most of the work has been confined to aluminum and stainless. But according to Linde Co., the developers, this method will apply to a wide range of hard-to-weld metals and alloys. For example, butt joints can be made in thick sections without edge preparation. Also, good depth-to-width ratios are possible.

Variety in Bimetal Pipe

Coming soon is a wider variety of sizes and properties in dual-metal pipe. Key to this development is the hot extrusion, or pilgering, of the centrifugally-cast product. One combination, tool steel over low-carbon steel, is undergoing tests for possible processing-roll applications in the sheet manufacturing trade.

Graphite Yarn for 5000°F

Here's the latest in graphite fiber products: Yarn that's good for use up to 5000°F. It can be sewed or woven into other materials. Strength of the yarn is about 25,000 psi. Individual filament strength is near 100,000 psi. And future yarns promise to be even stronger. Laboratory filaments already show strengths of 3-million psi.

New Modes for Beryllium

Beryllium producers are enlarging their product line. Among the new, pure-beryllium shapes recently fabricated by Brush Beryllium are thin-wall tubing and long lengths—up to 1400 ft—of 0.004-in. wire. Uses for the wire include filament winding of rocket engine parts. Recent developments by Beryllium Corp. in the alloy field include wrought beryllium-nickel strip and fine-grained, beryllium-copper castings.

Gains in Powder Metallurgy

Techniques for making powder metallurgy parts more versatile were disclosed at the technical sessions. One method calls for Alphatizing (IA, Oct. 19, p. 133) to "coat" the powder compacts. Another, which involves impregnating with resins, results in powder parts that can be plated or used in a liquid medium.

Speeds Vacuum Melting

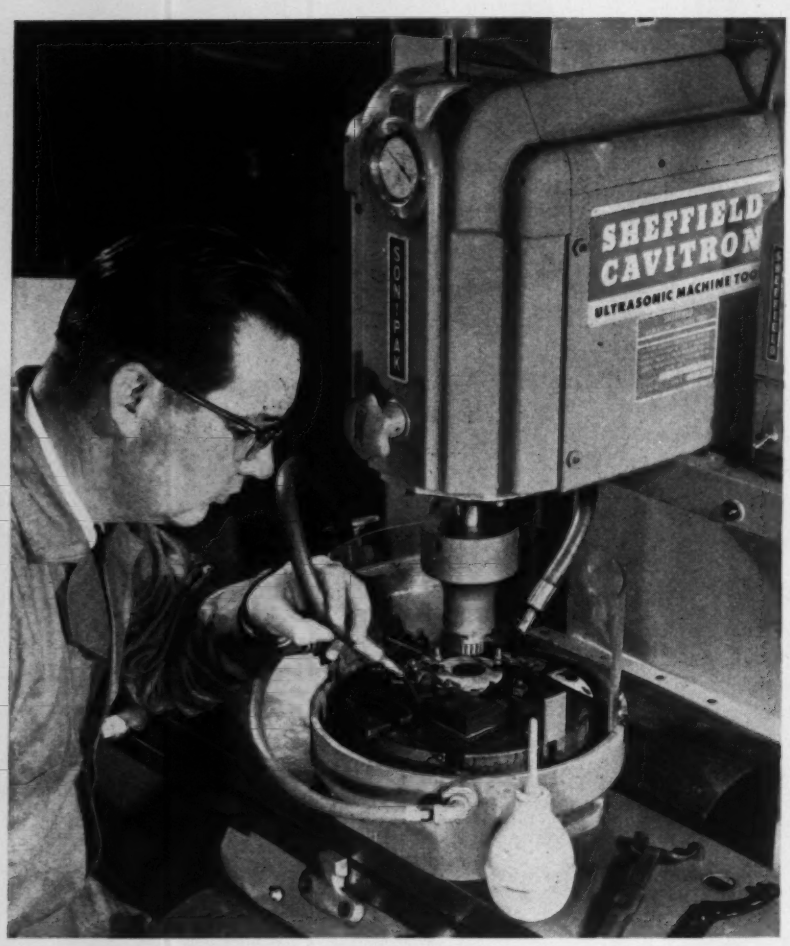
Three exhibitors at Cobo Hall last week jointly announced that the world's largest vacuum induction melting furnace is now in the works. This 10,000-lb capacity unit will melt and cast ingots for direct rolling, and electrodes for consumable arc furnace remelting. With a 1000-kw power supply, the huge furnace will melt 10,000 lb of metal in about three hours.

Upgrades "Moly" Sheet

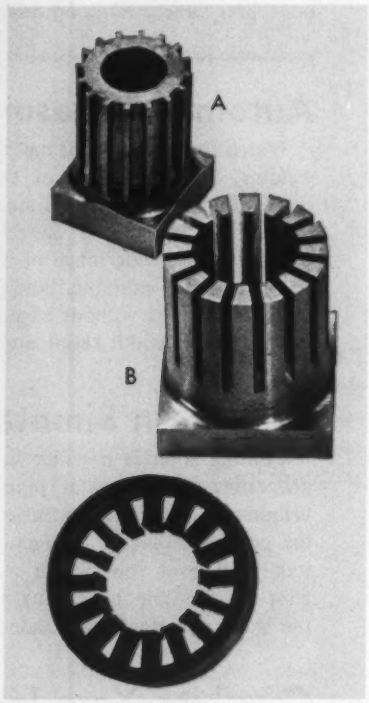
Two-foot wide tungsten and molybdenum sheet and plate will soon be available. Behind this long-awaited development is a special rolling process, which also improves product properties. For example, molybdenum sheet turned out by the new process exhibits excellent ductility along with high impact-strength properties. Specifically, the 3/16-in. sheet boasts a longitudinal tensile strength of 93,000 psi, with 36 pct elongation.

Thinner Memory Tapes

Ultrathin stainless steels and exotic alloys are now being rolled to 0.0001-in. thick, ±3 pct. Starting with "heavy" 0.002-in. stock, a new Sendzimer mill rolls metal to one-seventh the thickness of a postage stamp's glue. The mill takes 8-15 passes to bring the metal down to size. Strontium 90 gages all thickness readings. Maximum width of finished strip is 4¼ in.



On this Sheffield-Cavitron® Ultrasonic Machine Tool is shown the set-up for machining a motor laminator of ferrite — a material with the hardness of sapphire and the machinability of glass. Illustrated separately are a finished laminator and the two cutting tools involved. The smaller tool (A) first machines the small slots around the center of the ⅜" hole in the laminator to a tolerance of ±.001". The larger tool (B) then machines the 16 wedge-shape slots simultaneously, concentric with O.D. and I.D. within .002" T.I.R. "Working" this complex ferrite shape is typical of the capability of Sheffield Ultrasonic machine tools and NORBIDE boron carbide abrasive in broadening the machinability of modern materials.



Now it's easy–

with ultrasonic machining

...using NORBIDE* boron carbide

Yesterday, materials like ceramics, refractories and various new alloys were regarded as too hard or too brittle for conventional machining. Today, precision-machining these and many other materials is routine with ultrasonic machine tools.

Equally routine in this rapidly expanding field of machining is the use of NORBIDE boron carbide. Recommended by Sheffield and other machine tool builders, this Norton-developed abrasive has proved itself the ideal cutting agent.

Driven by a vibrating ultrasonic force, far beyond the range of the human ear, NORBIDE grit hits the work with an impact of 150,000 times the grain's own weight — *without fracturing*. Second only to diamonds in hardness and recognized as much more effective than silicon carbide grain, the Norton achievement is so free from impurities that every ounce delivers high-precision, trouble-free cutting action with maximum power and longest life.

Get more facts from your Norton Man on this tremendous advancement in modern machining. Find out how it can help you improve and economize your own production. See your Norton Distributor or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

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Reprint Explosion

Sir—We are interested in receiving copies of the article that appeared in the Oct. 12 issue, "Metalworking's Technological Explosion."

This article on Forming was the fourth of the series. What were the titles of the first three articles?—J. R. Clark, chief engineer, Union Carbide Consumer Products Co., Rocky River, O.

▪ **The three earlier articles in the series, which began last June 22, were titled, "Materials for the Future," "Future Power Systems," and "Steelmaking."**

Sir—I would appreciat · receiving reprints of your article on "Metalworking's Technological Explosion."—Robert N. Ciccarelli, engineer, General Electric Co., West Lynn, Mass.

Sir—We would appreciate receiving reprints of your series on "Metalworking's Technological Explosion." Kindly include our name on your mailing list for future issues.—Alexander S. Zelle, director of engineering, W. S. Rockwell Co., Fairfield, Conn.

Sir—Please send me a copy of the article on "Forming." If still available, please send copies of the three previous articles.—Bruce H. Danly, vice president, manufacturing, Danly Machine Specialties, Inc., Chicago.

Automation Report

Sir—We have received the Oct. 5 issue and are very pleased with the article on p. 79, "Automation Speeds Repair Work." We would like to compliment you on the fine job you did in reporting how short-run orders are processed through our shop across the Warney & Swasey machines. I would appreciate if you could send me reprints.—Guy R. Woodward, purchasing agent, Caterpillar Tractor Co., Davenport, Iowa.

Metal Fatigue

Sir—Would you please send me tear sheets of "NBS Conquers Metal Fatigue," which appears on p. 72-73 of the Oct. 5 issue.—Dr. John T. McCormack, professor of metallurgy, Clemson College, Clemson, S. C.

Sir—Would you be good enough to supply tear sheets of the article on p. 72-73 of the Oct. 5 issue.—J. H. Shoemaker, Kolene Corp., Detroit.

Canadian Request

Sir—We would appreciate receiving reprints of "New Steel Machines Faster" (IA, Oct. 5, p. 82).—E. M. Elkin, research supervisor, Canadian Copper Refiners Ltd., Montreal, Canada.

▪ **In all cases, reprints have been sent.—Ed.**

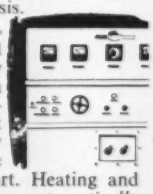
"I finally convinced the boss that I'm doing the work of two men. Sorry I had to use your name."

MARIAN A. STACHOWIAK, Hayes Induction Heating Engineer, reports . . .

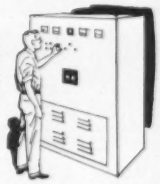
SELECTIVE HEAT TREATING CAN BE SIMPLE . . .

when equipment and application know-how go to work

High-Frequency Induction Heating . . . standard procedure for selective hardening, melting, annealing, brazing, preheating, hot forming, sintering, and vacuum heating . . . now takes a big step forward with another Hayes development — a new high-frequency induction unit that puts selective heating on a *simple* and *economical* basis.



PUSH-BUTTON Controls are featured with this new Hayes induction heater to obtain instant and exact heat distribution at any desired surface area of a steel part. Heating and quenching cycles are *automatically controlled* and are so rapid that distortion, decarburization, and excessive oxidation are practically eliminated. Protective atmosphere systems (pioneered by Hayes) can be supplied as an integral part of the induction unit.



UNIT Design Saves Space — because heater stations and power generator are incorporated in *one* compact cubicle . . . for more output per sq. ft. of floor space. Moreover, the Hayes unit includes work handling devices which can be set up simply, integrated into your production line, and operated as easily as any other machine tool.

Safe, Easy Maintenance is another feature of Hayes' design. Easy-access panels provide plenty of working room for maintenance and adjustment of components. Safety interlock switches throughout shut off plate power when panels are opened. Write for information on Hayes new induction heating unit, work tables and accessories . . . or other "Results Guaranteed" furnaces in Hayes Certain Curtain line.

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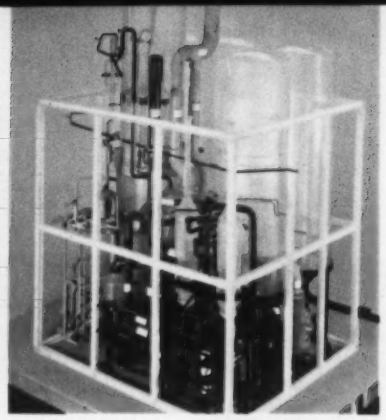
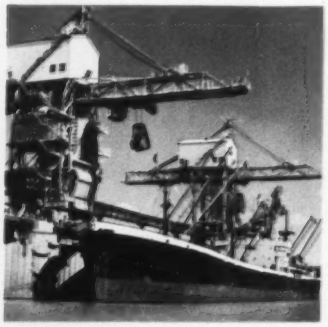
MINNESOTA: Taconite shipping facility—2,334-foot dock, harbor and breakwater — built by Dravo on Lake Superior.



MICHIGAN: Engineering model of the cold box for 280-ton-per-day oxygen plant, now under construction for steel division of a major auto maker, will be first low pressure plant in U.S. to produce simultaneously gaseous and liquid oxygen without high pressure cycle. Dravo designs and builds air and gas separation plants under arrangement with Linde AG of Munich, Germany. Dravo turn-key services also include power and steam plants, water pumping and treatment stations, other plant utilities. Send the coupon for data.

LOUISIANA: Dravo-built twin unloaders and dock handle variety of materials at versatile ship/barge facility on Lower Mississippi. Rugged, efficient materials handling equipment can reduce costs of unloading ore, coal, other bulk commodities and containerized cargo for water-side plants and port installations. Send coupon for details.



PENNSYLVANIA: Dravo *Tru-weld* grating is produced by modern, highly automated equipment. It is used on all types of applications where open steel flooring and stairs are needed; is available direct or from distributors throughout U.S., in standard panels or fabricated. Check coupon for information.

NEW YORK: New forced air, stationary cooler, new sinter breaker, hot screening facilities and other plant modifications helped major steel producer improve sinter quality and production. Similar programs are underway for two other existing plants. Check coupon for information on stationary, induced-draft circular or straight-line coolers, breakers, screens or sinter plant modernization services.

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- ☐ Oxygen Plants
- ☐ Mill Lubrication
- ☐ Turbo Blowers
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- ☐ Ore Bridges
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MORE RANGE AT MUCH LOWER COST THAN TWIST DRILLS

FULLY ENGINEERED BLADE GRIND...

Increased cross section at the cutting edge provides Greater Thermal Efficiency—Longer Tool Life than competitive blades.

FREER CUTTING ACTION

Exclusive Erickson method of grinding cutting angles gives Freer Cutting Action since end pressures are reduced.

"Heeling" eliminated.

EASY-TO-USE GRINDING FIXTURE...

Restores Original Factory Grind eliminating biggest obstacle to use of Spade Drills.

All cutting angles maintained during successive regrinds to original factory grind.

SPADE DRILL HOLDERS CORRECTLY ENGINEERED

"Funnel Effect" provided in flute design to speed chip escape.

Scientific distribution of coolant over whole cutting edge.

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FATIGUE CRACKS

Trick or Treat

Our Chicago news editor Keith Bennett is an old hand at covering labor stories. He has been through several steel strikes and many other labor stories in almost 10 years of covering the Windy City.

But, walking along Chicago's stately Michigan Ave. last week, he came on something new in labor tactics. Following is his teletyped message:

Chicago labor negotiations at one time were associated with swinging baseball bats and judicious use of a piece of lead pipe.

But a new look appeared when pickets began marching in front of the Michigan Ave. offices of Remington Rand Div. Switching to a soft-sell technique, the entire group of 20 pickets wore Hallowe'en costumes.

No Joking Mood—But they carried traditional hard-sell picket signs that left no doubt they were not in a trick-or-treat mood.

On the second day, the group showed up with another set of costumes, and attached colored balloons to the signs.

The pickets, from Locals 1059 and 459 of the IUE (AFL-CIO), were also cheered by the news that a request for an injunction against picketing had been refused. The line naturally drew out the combined press coverage by radio, TV, newspapers and national magazines.

In response to questions from The IRON AGE, the local secretary said the union had still another costume change in mind. Meanwhile, old-line union men are waiting and wondering.

Pools in the Snow

In this hectic atomic age, you've got to expect anything and everything. Therefore, word from Martin Co. that two backyard swimming pools are sitting in the snow on a mountain peak in Wyoming shouldn't be surprising.

There's method involved. It seems the pools are playing a part in starting up an AEC nuclear power plant at the site. It will supply heat and electricity to an Air Force radar station.

Martin engineers were faced with the problem of temporarily storing thousands of gallons of purified water which will serve as a radiation shield around the fuel core.

Since the water must be processed in advance of its use, the problem of storage came up. Hauling heavy tanks up to the top of the mountain was impractical. So the engineers came up with the idea of the pools which weigh only about 250 lbs each and can be collapsed.

Service Plus

Succeeding in business by trying, a California auto dealership has gone all out to service customers. At Berkey and Lee, Albany, Calif., visitors will find a two-chair barber shop, a restaurant seating more than thirty people, and an attractive patio-lounge. Now customers can get a lube job for the Volkswagen while they get a haircut and a lunch.

Calling all Cylinders

If you have an old hydraulic or air-powered cylinder, give it a close look.

Hanna Engineering Works, Chicago, is conducting a hunt for the oldest Hanna-made cylinder still in use. Cash rewards of $300 will be given plant engineers and other company men finding the oldest Hanna power cylinders in use.

This search is on to dramatize the company's 60 years in business. Entries must be received by November 30, in order to qualify. Address all inquiries to Hanna Engineering Works Search Contest, 1765 Elston Ave., Chicago 22, Ill.

If the capacity of your overhead equipment needs beefing-up, contact POLLOCK, the nation's foremost rebuilder of heavy-duty cranes. POLLOCK provides custom re-engineering service to meet the requirements of your shop. Alters spans. Converts D.C. to A.C. Installs new controls, new motors, drive shafts and gearing.

In cranes, cabs, trolleys, bridges—every type of overhead industrial hoisting equipment.

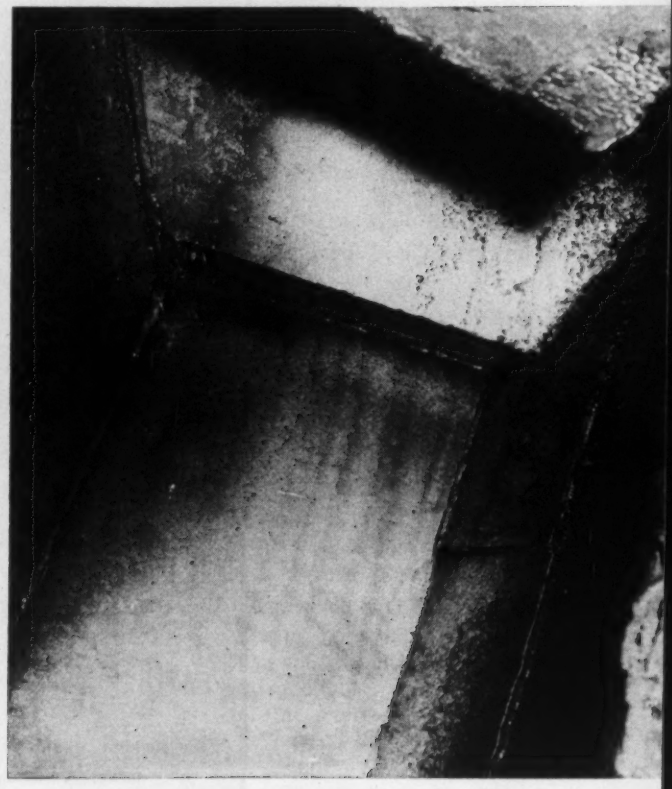
POLLOCK

ENGINEERING CO., INC.

POTTSTOWN, PENNSYLVANIA

Now you can get USS "T-1" Steel from Steel Service Centers coast to coast

Processing plant of Oriole mine. USS "T-1" Steel pays dividends in longer chute life, under the grinding action of coal and rock.



Chutes of USS "T-1" Steel outlast others 3 to 1

Coal and rock scraping across a piece of metal are highly abrasive. At the Bell and Zoller Coal Company's Oriole Mine near Madisonville, Kentucky, gravity chutes lasted about three months.

Oriole switched to USS "T-1" Steel furnished heat treated to a minimum hardness of 321 Brinell. In this harder condition "T-1" Steel offers maximum resistance to impact abrasion, yet retains toughness and weldability. These new chutes lasted nine months to a year. The extra cost of "T-1" Steel was wiped out almost immediately by the sizeable saving in the costs of material and fabrication, and by the extended life of the new chutes.

Now, USS "T-1" Constructional Alloy Steel, at 321 minimum Brinell, is used for all sluice and refuse chutes in the Oriole processing plant. More than 3,400 tons of coal and rock go banging and clanging down the chutes daily. Despite impact, abrasion and corrosion, the ⅜-inch-thick plates of "T-1" Steel stay smooth and clean. Coal doesn't clog the chutes.

Other uses where "T-1" Steel saves money. Shovel buckets can be built larger and lighter to scoop more load; truck bottom plates take more battering when made of "T-1" Steel and last longer. Continuous miner front ends, conveyors, vibrator frames—all take punishment better and reduce maintenance costs when made of USS "T-1" Constructional Alloy Steel.

USS "T-1" Steel and the new lower priced "T-1" type A Steel can be furnished to a minimum yield strength of 100,000 psi, or a minimum hardness of 321 Brinell, depending on application. USS "T-1" Steel can also be furnished to 360 Brinell. All of these tough, weldable steels can reduce weight and increase the strength and life of your equipment. Call your local Steel Service Center for more information. Or, for the name of the distributor of USS "T-1" Steels nearest you, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal and Iron Division • United States Steel Export Company

USS United States Steel

COMING EXHIBITS

Packaging Machinery Show—Nov. 7-10, Cobo Hall, Detroit. (Packaging Machinery Mfrs. Institute, 60 East 42nd St., New York 17.)

Marine Supplies & Equipment Show — Nov. 15 - 17, Hotel Roosevelt, New York City.

MEETINGS

NOVEMBER

National Warm Air Heating and Air Conditioning Assn.—Annual convention, Nov. 6-10, La Salle Hotel, Chicago. Assn headquarters, 640 Engineers Bldg., Cleveland.

Steel Service Center Institute—Pacific regional meeting, Nov. 11-14, Del Monte Lodge, Pebble Beach, Calif. Institute headquarters, 540 Terminal Tower, Cleveland.

Air Conditioning & Refrigeration Institute — Annual meeting, Nov. 12 - 15, The Homestead, Hot Springs, Va. Institute headquarters, 60 East 42nd St., New York.

Steel Founders' Society of America —Technical and operating conference, Nov. 13-15, Hotel Carter, Cleveland. Society headquarters, 606 Terminal Tower, Cleveland.

National Electrical Manufacturers Assn.—Annual meeting, Nov. 13-17, Traymore Hotel, Atlantic City. Assn. headquarters, 155 E. 44th St., New York.

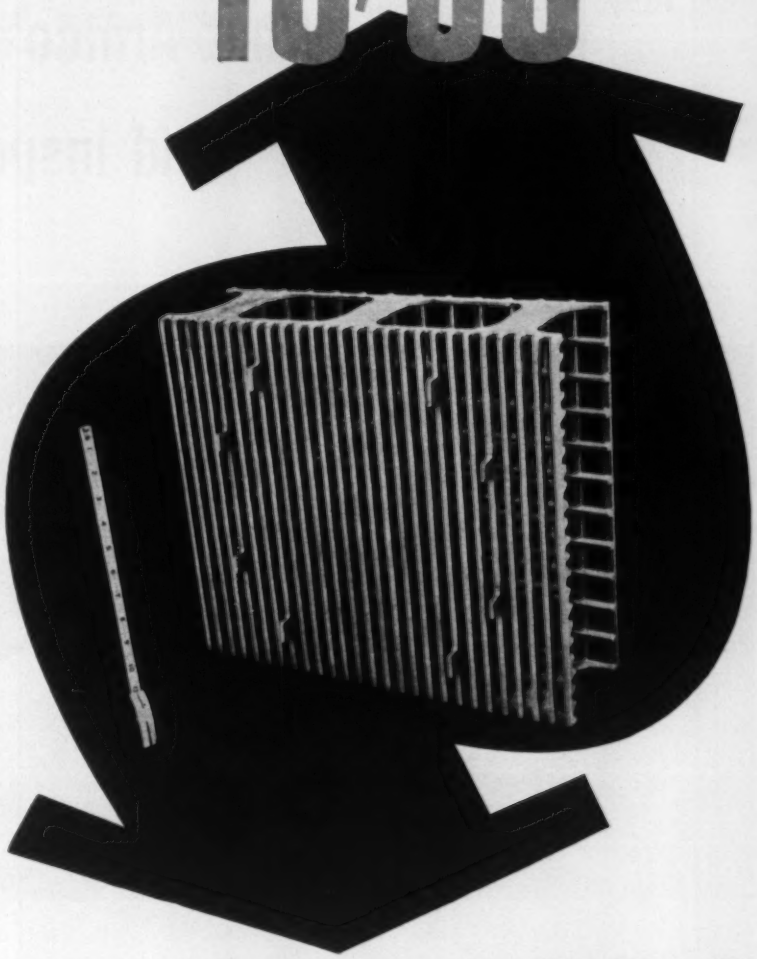
National Machine Tool Builders Assn.— Annual meeting, Nov. 14-16, Americana Hotel, Bal Harbour, Fla. Assn. headquarters 2139 Wisconsin Ave., N. W., Washington, D. C.

Society of Plastics Engineers—Regional technical conference, Nov. 15, Statler-Hilton Hotel, New York City. Society headquarters, 65 Prospect Street, Stamford, Conn.

National Foundry Assn.—63rd annual meeting, Nov. 15-17, Savoy-Hilton Hotel, New York. Assn. headquarters, 4321 St. Charles Rd., Bellwood, Ill.

(Continued on P. 26)

An intricate 15/35 casting—



—cast exceedingly well!

It's a carburizing furnace fixture, alloyed in the HT group for use in the automotive parts industry.

If a high alloy casting experience beginning in 1922 has any meaning—if having modern facilities in the three major casting types (static, centrifugal and shell-molded) has any meaning—if being in a position to provide any degree of finish desired has any meaning—that meaning is that you will get from Duraloy sound castings properly alloyed.

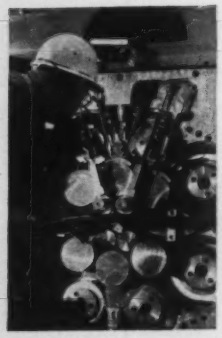
We can produce single castings up to 10 tons or assembled units to any size or shape that can be shipped and handled in transit. Bulletin G-261.

DURALOY

ALLOY CASTING INSTITUTE ACI MEMBER

DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
CHICAGO OFFICE: 332 South Michigan Ave., Chicago, Ill.
DETROIT OFFICE: 1025 Maple Road, Troy, Michigan
HOUSTON OFFICE: 4101 San Jacinto, Houston 4, Texas



What Armco's advanced array and inspection equipment

Bells ring, lights flash and pictures appear on the TV screen when stainless steel bars or billets with subsurface defects are dunked in Armco's "electronic bathtub." It's part of Armco's ultra-modern stainless production and inspection equipment, among the most advanced in the nation.

New steels are born at Armco

# of Stainless Steel production means to you

Wider selection plus high quality you can count on in stainless steel sheets, strip, bars and wire. That's what Armco's modern stainless production and inspection facilities offer you.

Wider Selection—These, for example, are a few recent additions to Armco's already great variety of stainless steels: Continuous mill produced sheets up to 48 inches wide; cold-rolled and temper-rolled plates up to 72 inches wide and 216 inches long; range in bright annealed strip increased to 12 different grades.

High Quality You Can Count On—At every production step, Armco uses the newest special inspection and control methods to assure you of cost-saving uniformity during fabrication. In Armco Stainless Bars, for example, *controlled uniformity* means fewer tool adjustments and costly rejects in your shop.

For durability, strength, economy.

This is only part of the story, but we'll be happy to give you complete information on Armco's full range of stainless steels. Write us or contact a distributor of Armco Stainless Steels listed on this page. **Armco Division, Armco Steel Corporation, 2071 Curtis Street, Middletown, Ohio.**

ARMCO Armco Division

GET SELECTION AND QUALITY IN ARMCO STAINLESS FROM THESE STEEL SERVICE CENTERS

(A) Sheets, Strip and Plates (B) Bars and Wire

AMERICAN STEEL & ALUMINUM CORP. (AB)
Hartford, Conn.

AMERICAN STEEL & ALUMINUM CORP. OF MASS. (AB)
Cambridge, Mass.

BROWN-WALES COMPANY (AB)
Cambridge, Mass.—Auburn, Maine—Worcester, Mass.

CENTRAL STEEL & WIRE COMPANY (AB)
Chicago, Ill.—Cincinnati—Detroit—Milwaukee

CHICAGO STEEL SERVICE COMPANY (AB)
Chicago, Ill.

CLEVELAND TOOL & SUPPLY COMPANY (B)
Cleveland, Ohio

THE CONGDON AND CARPENTER COMPANY (AB)
Providence, R. I.—Fall River, Mass.—Natick, Mass.

C. A. CROSTA, INC. (A)
Denver, Colo.

DUCOMMUN METALS & SUPPLY COMPANY (AB)
Los Angeles, Calif.—Berkeley—Phoenix—San Diego—Seattle

EDGCOMB STEEL & ALUMINUM CORP. (AB)
Hillside, N. J.

EDGCOMB STEEL COMPANY (AB)
Philadelphia, Pa.—Charlotte, N. C.—Greensboro, N. C.—York, Pa.

ESCO CORPORATION (AB)
Portland, Oregon—Denver—Emeryville, Calif.—Eugene, Oregon—Honolulu—Los Angeles—Seattle—Spokane—Vancouver, B. C.

PETER A. FRASSE & COMPANY, INC. (AB)
New York, N. Y.—Buffalo—Hartford—Lyndhurst, N. J.—Philadelphia—Syracuse

FIRTH BROWN STEELS LTD. (AB)
Montreal, P. Q.—Toronto

GATE CITY STEEL, INC.—OMAHA (AB)
Omaha, Nebr.—Columbus, Nebr.

INDUSTRIAL STAINLESS STEELS, INC. (B)
Cambridge, Mass.—Buffalo, N. Y.

EARLE M. JORGENSEN COMPANY (AB)
Los Angeles, Calif.—Dallas—Denver—Honolulu—Houston—Oakland—Phoenix—Seattle—Tulsa—Wichita

MAPES & SPROWL STEEL COMPANY (AB)
Union, N. J.

METAL GOODS CORPORATION (AB)
St. Louis, Mo.—Dallas—Denver—Houston—Memphis—New Orleans—N. Kansas City, Mo.—Tulsa—Wichita

MONCRIEF-LENOIR MFG. COMPANY (AB)
Houston, Texas—Dallas—Harlingen—Lubbock—San Antonio—Temple

MORRISON STEEL COMPANY (AB)
New Brunswick, N. J.

THE ORLEANS STEEL PRODUCTS COMPANY, INC. (A)
New Orleans, La.

WILLIAM M. ORR COMPANY, INC. (AB)
Pittsburgh, Pa.

PAPER-CALMENSON & COMPANY (A)
St. Paul, Minn.

SEABOARD STEEL & IRON CORP. (B)
Baltimore, Md.

SENECA STEEL SERVICE, INC. (AB)
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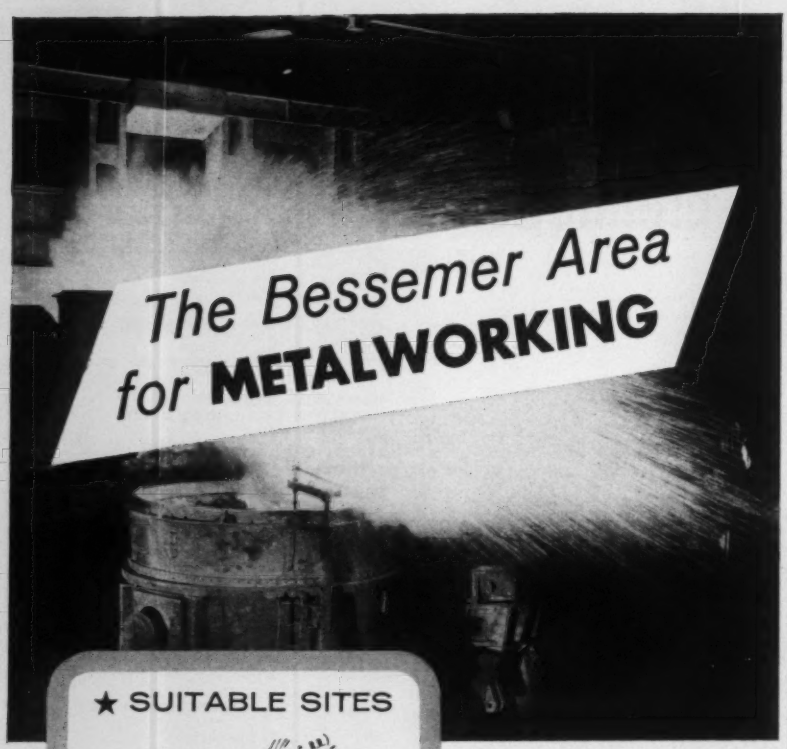
J. M. TULL METAL & SUPPLY CO., INC. (AB)
Atlanta, Ga.—Birmingham—Greenville, S. C.—Jacksonville—Miami—Tampa

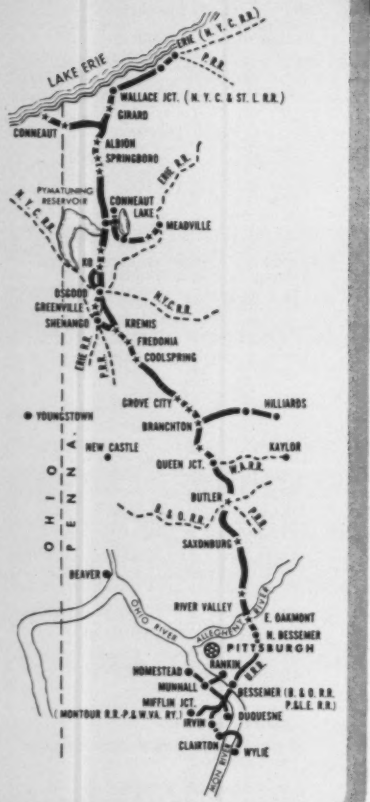
VIKING STEEL COMPANY (AB)
Cleveland, Ohio

VORYS BROTHERS, INC. (AB)
Columbus, Ohio

YORK CORRUGATING COMPANY (A)
York, Pa.—Washington, D. C.



★ SUITABLE SITES



- Ready availability of primary and fabricated metals, and metal products.
- Low basic freight rates. Wider coverage with rates and routes than is generally obtainable.
- First or second morning delivery to principal Lake Erie ports . . . second morning to New York, Chicago, and St. Louis markets.
- Non-metropolitan costs for labor, taxes, utilities, and other operating overhead.
- Technical assistance available at over 20 outstanding research centers.
- Superior cultural, educational, and recreational facilities.
- One of America's great concentrations of population and purchasing power within 125-mile radius.

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BESSEMER and LAKE ERIE RAILROAD CO.
INDUSTRIAL DEVELOPMENT DEPARTMENT
1830 FRICK BUILDING, PITTSBURGH 30, PA.
THE BESSEMER MAN IS AT YOUR "SITE SERVICE"

MEETINGS

(Continued from p. 23)

National Assn. of Aluminum Distributors—11th annual convention, Nov. 15-18, Arizona-Biltmore Hotel, Phoenix. Assn. headquarters, 1900 Arch Street, Philadelphia.

Society of Carbide Engineers—Annual meeting, Nov. 18, Belmont Plaza Hotel, New York City. Society headquarters, P. O. Box 45, Newington 11, Conn.

American Society of Mechanical Engineers—Winter annual meeting, Nov. 26-Dec. 1, Statler-Hilton Hotel, New York. Society headquarters, 29 West 39th St., New York.

Plumbing Brass Institute—Annual meeting, Nov. 27-29, Savoy-Hilton Hotel, New York City.

American Management Assn.—Materials Conference, Nov. 27-29, Savoy-Hilton Hotel, New York City. Assn. headquarters, 1515 Broadway, Times Square, New York 36.

American Institute of Steel Construction—Annual meeting, Nov. 27 - 30, Boca Raton Hotel, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.

National Assn. of Corrosion Engineers—Regional corrosion conference of the Southeast Region, Nov. 27-Dec. 1, Key Biscayne Hotel, Miami, Fla.

DECEMBER

Malleable Founders Society — Semi-annual meeting, Dec. 1, Hotel Sheraton-Cleveland, Cleveland. Society headquarters, 781 Union Commerce Bldg., Cleveland.

American Institute of Chemical Engineers—54th annual meeting, Dec. 3-6, Hotel Commodore, New York. Institute headquarters, 25 W. 45th St., New York.

Metallurgical Society of AIME—10th Electric Furnace Conference, Dec. 6-8, Sheraton Hotel, Philadelphia. Society headquarters, 29 West 39th St., New York.

NEW 2H10

disc grinds parts to millionths

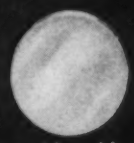
compact Gardner Double Disc Grinder finishes small precision parts at high output

This is the smallest machine in the Gardner 2H series. It is equipped with either 12" or 15" discs and 3, 5, 7½ or 10 hp motors.

grinds two surfaces parallel in one operation

disc grinds parts like these

counter pinions



contact lens blanks

ceramic insulators

magnet cores

small bearing rolls

miniature bearing races

GARDNER

GARDNER MACHINE COMPANY, BELOIT, WISCONSIN

An automatic coiler forms .063 Johnson tinned music spring wire into an automobile brake cylinder spring. Because this spring will spend its life in a bath of corrosive brake fluid it needs a heavy, uniform tin plating that will not peel, crack or flake. It is a critical spring with 12½ coils, held to tight tolerances and coiled with two different end sizes. The larger end is 1.034 inches while the smaller end is .710 inch.

Mid-Continent Spring Company of Ky. says . . .

Dependable Johnson Music Spring Wire Gives Precision Springs Reliability

Dependable quality and quick service are two major reasons Johnson wire is specified in Kentucky spring plant

"After 23 years in the spring manufacturing business, I'll give you my one-word description of Johnson Steel & Wire Company's spring wire . . .

"It's DEPENDABLE."

So says L. B. Langhi, president of Mid-Continent Spring Company of Ky.

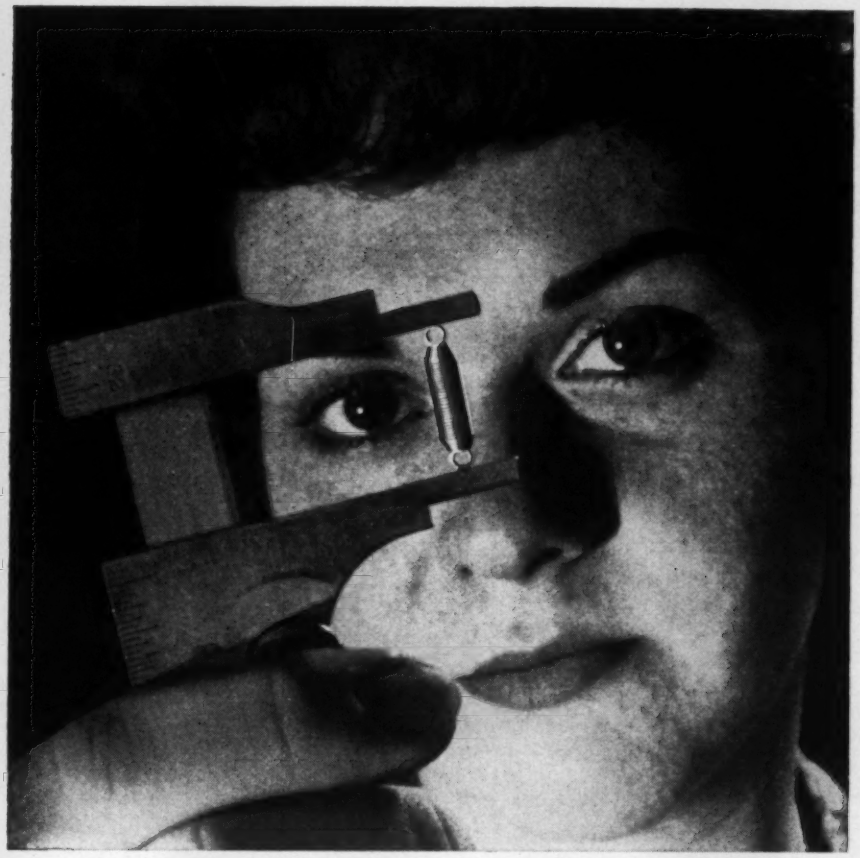
And that goes for Johnson's high carbon wire destined for springs that snap into action at the critical moment of a missile launching or simply make a baby doll wink, as Mr. Langhi explains.

Regardless of their job, it's vitally important to Mid-Continent's customers that springs function with precision. So the firm's plant at Hopkinsville, Ky., builds reliability into all its products, whether for space flights, toys, automotive and electrical parts or vending machines.

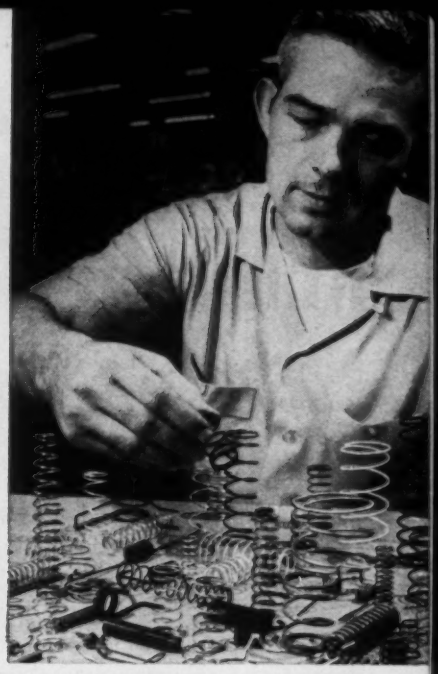
This reliability depends as much upon the raw materials of the springs —music spring wire or oil tempered spring wire—as it does upon the skills of Mid-Continent's spring makers.

Mr. Langhi said: "Because our customers depend upon our springs to give them a full measure of value, we demand and get wire from Johnson that has a uniform quality in finish, temper, size and physical properties.

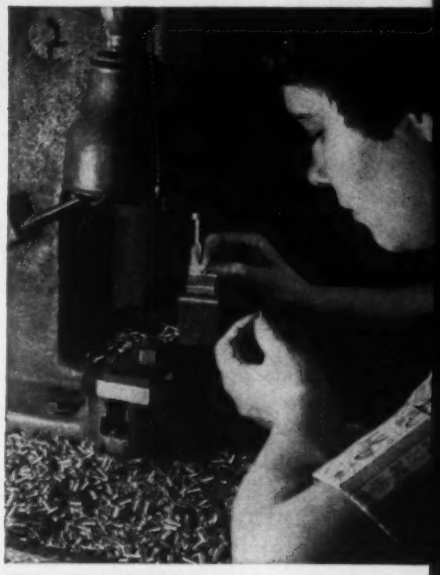
"Coatings on Johnson tin-coated



A carburetor control extension spring must be held to unvarying tolerances to insure consistent performance. This important spring is made of Johnson .010 tinned music spring wire, has an O.D. of .118 inch and measures ¾ inch outside the loops.



R. M. Worthman, purchasing agent for Mid-Continent Spring examines some of the one thousand different type springs manufactured at Mid-Continent.



This tiny vending machine extension spring is made of Johnson .013 tinned music spring wire, has .158 I.D. and 22 turns.

music spring wire are both uniform and adherent. This eliminates peeling, cracking or flaking during our coiling operation."

High physical properties, uniform cast and smooth surfaces are other important requirements since Mid-Continent springs must form within strict dimensions and carry precise work loads.

At Mid-Continent, accuracy of wire dimensions greatly affects spring coiling and performance. Close tolerances on dimensions are met consistently in fine wire specialties produced by Johnson Steel & Wire Company.

"Our production averages over a million springs per day," said R. M. Worthman, purchasing agent for Mid-Continent Spring.

"Because of this, we keep our warehouse stocked with at least 300 tons of wire. Johnson supplies us with a range of .008-inch to .207-inch music spring wire and oil tempered wire.

"Whenever our wire stock begins to deplete, we're able to call for and get fast delivery service from Johnson's mill in Worcester or from its warehouses in Chicago or Akron.

"Of the 64 different types of brake drum springs we manufacture, 90 percent of them are made of Johnson wire. That's what we think of Johnson Steel's wire."

Let Johnson start today to help you with your high carbon spring wire needs.

Just call the nearest district sales office and talk with a Johnson representative. He's ready to help you with whatever your wire and spring problems might be—right now.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Akron	Cleveland	Detroit	Los Angeles	Pittsburgh
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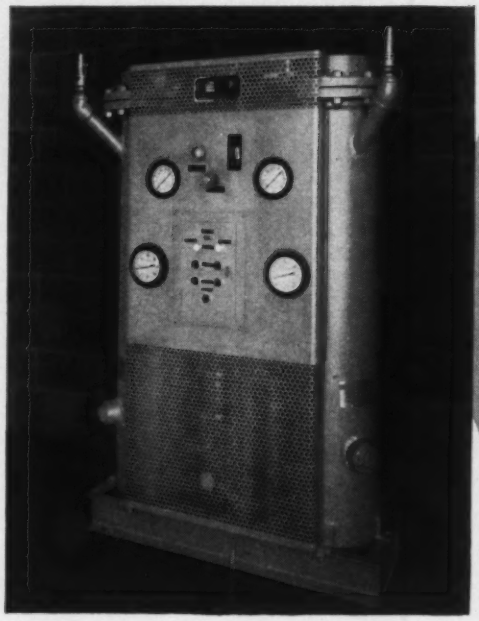
For precise atmosphere control in metalworking . . .

KEMP ORIAD DESICCANT DRYERS

give you 3 big advantages!

- In drying compressed air for air tools
- Drying hydrogen, helium, nitrogen
- Purifying furnace gases
- Drying instrument air
- Metal treating and brazing
- Drying air for paint sprays
- Testing equipment



1 Complete reactivation

Unequalled extra-drying power is assured with the unique 3-zone embedded heater in every Kemp Oriad Desiccant Dryer. Reactivation is always complete and uniform in drying air, gases or liquids.

2 Complete temperature control

Thermostatic control conserves heat input . . . keeps ideal temperatures for the highest operating efficiency at the lowest operating costs. The entire network is protected by an alarm circuit.

3 Complete automatic operation

Once the program timer is set, everything is regulated automatically. Drying takes place with the least loss in pressure, the lowest cost in maintenance and operation. For further information, write for Bulletin D-103 . . . or call the man from Kemp listed in the Chemical Engineering Catalog.

It always pays to come to **KEMP** OF BALTIMORE

THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver Street • Baltimore 2, Maryland

This man...
is running this locomotive

There is no one in the locomotive. The man in the picture can speed up, slow down, stop or reverse this train, *whether he is riding the locomotive or walking, or standing on the ground.* Both he and the locomotive are equipped with a new Union Switch & Signal remote control system for industrial switching locomotives. Because the operator always can be at the best vantage point, blind operations are eliminated and cars are spotted for loading, unloading or dumping more efficiently. This man can put a car *precisely* where he wants it.

You can minimize the hazards involved as freight moves around your plant with this unique remote control system. If you have a special problem such as moving cars into a thawing pit or under a loading chute, use a centrally located console control unit so one man has complete control over the entire operation.

Look over your in-plant locomotive operation and see if it couldn't be made safer and more efficient if the man running the train could always see what he was doing. Check the coupon for our illustrated Bulletin 187 on how our remote control systems can work for you.

Union Switch & Signal
Division of Westinghouse Air Brake Co.
Pittsburgh 18, Pennsylvania

☐ Please send Bulletin 187 on Union Switch & Signal remote control systems.

☐ Please have representative call.

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"Pioneers in Push-Button Science"

UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY—
PITTSBURGH 18, PENNSYLVANIA
NEW YORK . . . PITTSBURGH . . . CHICAGO . . . SAN FRANCISCO

STRENGTH + LIGHT WEIGHT
That's the Beauty of Steel

DESIGN NOTE: The Military Ranger used N-A-XTRA 90 (minimum yield strength, 90,000 psi) in bars and plates ranging to 1" thick, in main frame and cross members, loader mechanism and fork carriage. Fabrication followed standard gas cutting and welding procedures. Excellent weldability of N-A-XTRA was important in joining to other steels.

N-A-XTRA 90 plates and bars are used in the "Ranger," a rough terrain military vehicle designed, developed and fabricated jointly by the U. S. Army Quartermaster Corps and the Clark Equipment Company, Battle Creek, Michigan. The Ranger series is manufactured by the Industrial Truck Division of Clark Equipment Company.

Great Lakes Steel is a Division of

ROUGH TERRAIN MILITARY FORK TRUCK USES N-A-XTRA HIGH-STRENGTH STEEL FOR MAXIMUM LOADABILITY WITH MINIMUM WEIGHT

The U. S. Army needed a material handling truck in 6, 10 and 15 thousand-pound-capacity sizes that would, among other things, operate in five feet of salt water . . . traverse sand beaches, rough terrain . . . climb 45% grades at a minimum of 2.0 m.p.h. . . . 15.0 m.p.h. loaded on the highway . . . load and unload from the far side of a flat car . . . tilt loads 30 degrees back, 45 degrees forward, 10 degrees from the horizontal left or right. *And all this within dimensional and weight requirements that would allow air transport of the vehicle.*

The U. S. Army Quartermaster Corps and the Industrial Truck Division of Clark Equipment Company came up with the answer—the Military Ranger. It meets or exceeds every operating requirement. And does it within the vital weight limit by using N-A-XTRA 90 high-strength steel in main frame, cross members, loader mechanism and supporting structure. N-A-XTRA handles the job in these high-stress areas, yet weighs three times less than mild carbon steel of equivalent strength.

You may never have to air-lift your equipment, but that's not the only problem N-A-XTRA solves. Rugged operating conditions, heavy loads and weight-saving construction—in such applications as, for example, heavy machinery and pressure vessels—are challenges that N-A-XTRA is designed to meet and beat.

With excellent weldability, formability, and toughness even at subnormal temperatures, N-A-XTRA low carbon, extra-strength alloy steels give superior results with conventional fabricating methods, including cold forming, gas cutting, shearing and machining. N-A-XTRA high-strength steels are available in four levels of minimum yield strength, from 80,000 to 110,000 psi, and in sizes ranging from $\frac{1}{8}$ to $1\frac{1}{4}$" thick, up to 72" wide and up to 35' long. For further information, write Great Lakes Steel Corporation, Product Development, Dept. IA-16, P. O. Box 7310, Detroit 2, Michigan.

a product of

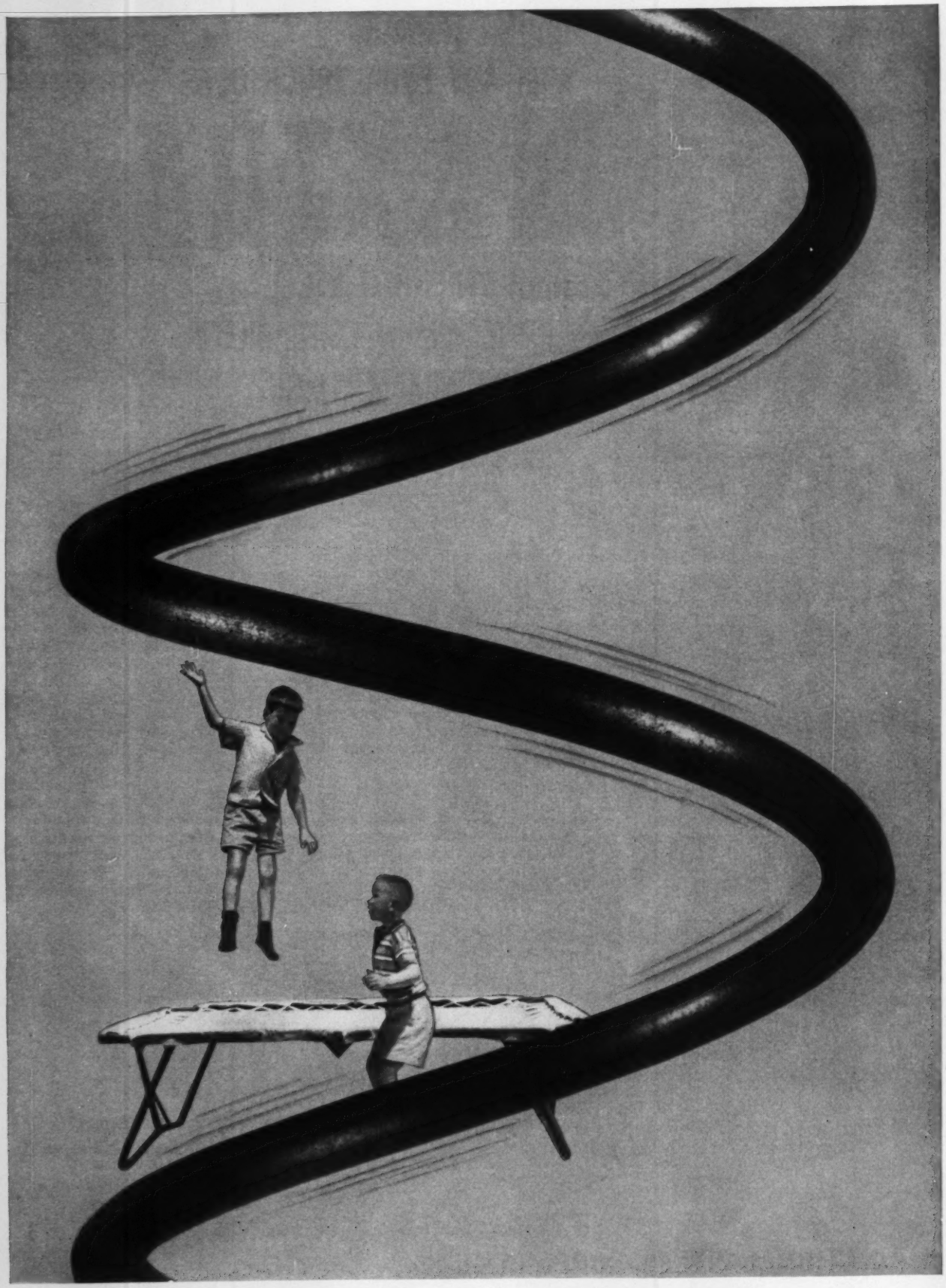
GREAT LAKES STEEL

Detroit 29, Michigan

N-A-XTRA STEELS ARE AVAILABLE AT THESE STEEL SERVICE CENTERS

Benedict-Miller, Inc. Lyndhurst, New Jersey	Joseph Demsey Co. Cleveland, Ohio	Ducommon Metals & Supply Co. Los Angeles, California
Interstate Steel Co. Des Plaines, Illinois	Lockhart Iron & Steel Co. Pittsburgh, Pennsylvania	Marsh Steel & Aluminum Co. Kansas City, Missouri
O'Neal Steel, Inc. Birmingham, Alabama	Salt Lake Hardware Co. Salt Lake City, Utah	A. C. Leslie & Company, Ltd. Montreal, Canada

NATIONAL STEEL CORPORATION



BOUNCE
BOUNCE
BOUNCE

...with CF&I Oil Tempered Wire

Trampoline springs lead a hard life. They work while others play, and no matter how much punishment they absorb, they've got to keep coming back for more. Which is one of the many reasons for forming this and other types of hard-working springs from CF&I Oil Tempered Wire. This tough, premium product has the high fatigue resistance and long life that keep spring performance *up*... the easy-working qualities that keep production costs *down*.

CF&I Oil Tempered Wire is available with Black Satin Finish that serves as a lubricant during coiling and crimping operations and prevents "flake-off." Because it virtually eliminates "stop-and-go" operations, Black Satin cuts machine downtime and production costs. This wire is available in continuous unwelded lengths weighing up to 600 lbs. Straightened and cut lengths from 6″ can also be supplied.

Oil Tempered Wire is only one of the many types produced by CF&I (a partial list is shown below). They are "packaged for your production" in special packages to increase the efficiency and economy of your operation. For complete details, contact your nearby CF&I sales office today.

8474

Steel ... your assurance of American-made quality

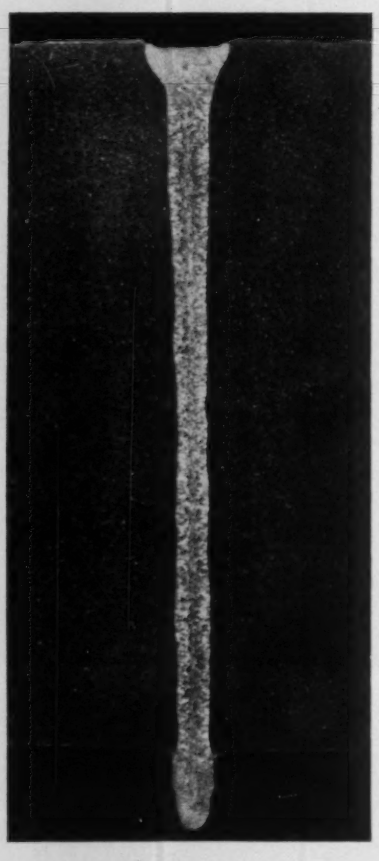
The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
Sales Offices in Key Cities

CF&I STEEL MADE IN U.S.A.

A partial list of wires produced by CF&I: ACSR Core • bee • bookbinder • brush • chain • concrete reinforcing tie • die spring • flat, low and high carbon • glass netting • hose, reinforcement • lock spring • mattress • picture cord • screen • square, high carbon • stone • weaving

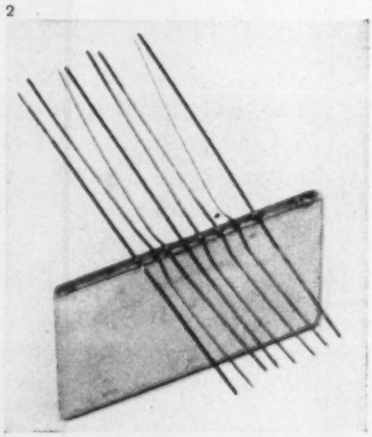
"Impossible" welds

Welds that are impossible by any other technique are now routine with Hamilton-Zeiss' high-energy density electron-beam welding. Hamilton-Zeiss equipment offers you unique performance combined with flexibility, reliability and repeatability / Difficult materials, unequal dimensions and deep penetrations present problems that only Hamilton-Zeiss welding equipment can solve with its high-energy density and precision electron-beam focusing by the exclusive Zeiss magnetic lens system. The Hamilton-Zeiss weld, created in a vacuum, offers these significant advantages: virtual elimination of contamination, close control of penetration, low thermal distortion and close dimensional control. Exhaustive tests demonstrate conclusively that welds produced by the Hamilton-Zeiss method are as strong as the original materials. Supporting metallurgical data are available for your inspection / For full information call Hamilton-Electrona, Inc., exclusive marketing agent for Hamilton-Zeiss equipment in the United States and Canada.



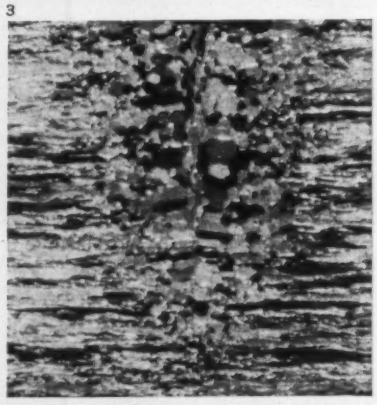
1 / Penetration study of one-inch thick Type 302 stainless steel reveals an amazing depth-to-width ratio. High-energy density and sharp focusing produce this unique weld with no reduction in the original strength of the material.

2



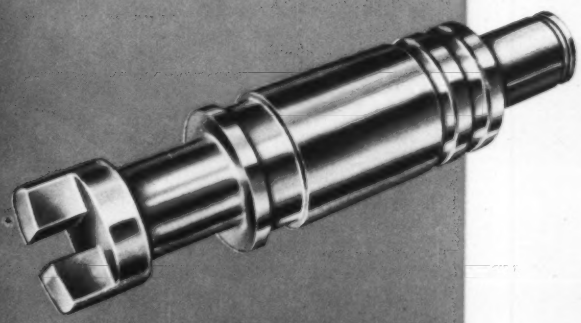
2 / Copper ribbon wires (0.002" x 0.010") welded to the edge of a nickel-plated ceramic substrate. This is just one demonstration of the ability of Hamilton-Zeiss equipment to weld dissimilar materials. Because of the unique design of the Hamilton-Zeiss equipment, electrons travel at approximately 110,000 miles/second to the work piece.

3



3 / Study of weld on 0.100" tungsten shows minimum grain growth and no evidence of contamination. The high-energy density beam minimizes grain growth because welding time is extremely short and heat is applied to an exceptionally small zone. Contaminants are eliminated by welding in a high vacuum without filler; impurities are outgassed during the cycle.

HIGH-ENERGY DENSITY ELECTRON-BEAM WELDING BY HAMILTON-ELECTRONA, INC. / TIME-LIFE BUILDING, ROCKEFELLER CENTER NEW YORK 20, N.Y / PHONE PLAZA 7-9548-9



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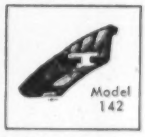
ENGINEERED OIL SEALS for Steel Mills

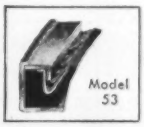
Garlock KLOZURE* Oil Seals (left) help keep lubrication in, dirt out of roll neck bearing at Inland Steel's East Chicago mill.

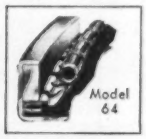
Inland Steel applies Garlock KLOZURE Oil Seals for protection of mill roll neck bearings at East Chicago.

Minimizing lubrication leakage from the inboard and outboard ends of the bearings, Garlock KLOZURE Oil Seals provide more constant service as the rolls change position in a lateral movement during operation. Inland finds, too, that in atmospheres of dirt, scale and spray, KLOZURE Oil Seals help keep foreign particles from entering—and damaging—the bearings.

For good, economical bearing protection, Inland joins the growing list of steel producers who use Garlock KLOZURE Oil Seals. Wherever you look in mills, you'll find a specific type of KLOZURE Oil Seals doing a specific job. Model 142, for instance, helps keep water splash and scale out of bearings at the shoulder of mill rolls. Models 64 and 82 protect bearings on back-up and work rolls. Model 53 is recommended for table rolls at normal and high speeds. Model 23 Split KLOZURE is ideal where equipment cannot be dismantled too easily.







Designed for peak efficiency and durability, Garlock KLOZURE Oil Seals resist oil and grease, are impervious to water, mild acids, alkalies, withstand temperatures from −40°F to +250°F. For extreme conditions, Garlock furnishes sealing elements resistant to practically any fluid, and serviceable as high as +500°F.

If you have a particular sealing problem, why not discuss it with your Garlock representative. He's backed by over 70 years of experience in engineering, production and application. Call him at the nearest of the 26 Garlock sales

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Metalworking Newsfront 6

FORECASTS FOR METALWORKING were made at a recent meeting of the National Assn. of Business Economists. For 1962 the economists see steel production at 110 to 115 million ingot tons. Aluminum industry analysts expect their operations to hit 90 pct capacity (77 pct this year). Moderate production gains, with stable prices, are forecast for lead, zinc and copper.

A NEW WAY TO FORECAST INDUSTRIAL RESEARCH SPENDING is being used by Battelle Memorial Institute economist, G. W. James. He analyzes cash flow of companies and industries. He finds management views research spending as an investment. As funds for such investments can't be obtained from outside sources, companies turn to retained earnings and depreciation accounts.

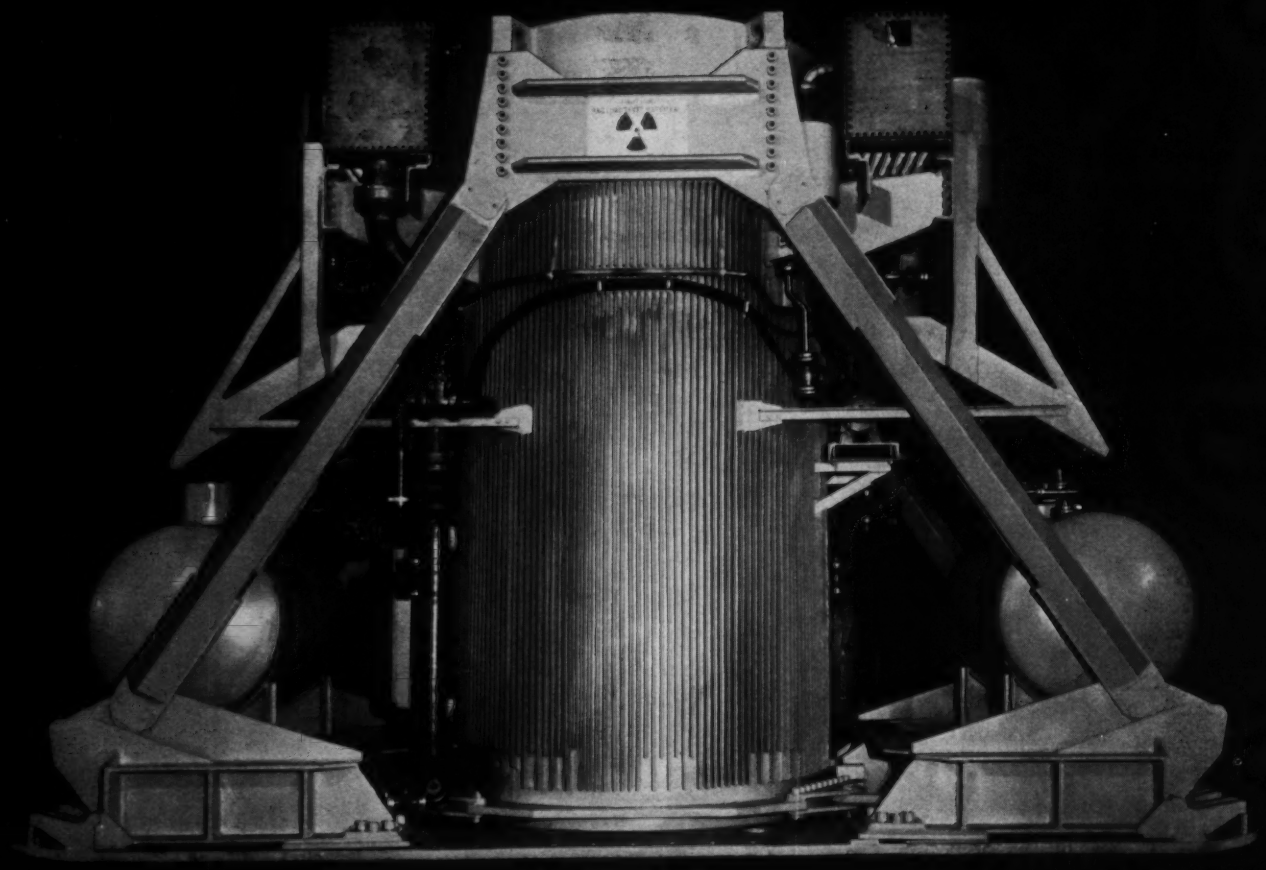
THE U. S. ARMY IS SPENDING more on automotive and tank equipment in 1961 than on missiles. This is the first year this has occurred since the Korean War, says Brigadier General J. F. Thorlin, chief of Ordnance-Tank-Automotive Command. He says his budget is $1.2 billion; missiles, just over $1 billion.

A TURN IN APPLIANCE PRICES may be in the wind. Elisha Gray, II, Whirlpool Corp. board chairman, has announced 1962 increases of 3 to 5 pct in factory prices on his company's appliance lines.

"EXPLOSIVE CHANGES" IN AUTOMATIC CONTROL are imposing greater demands on instrumentation. This is the view of J. T. Pitts, sales manager of Minneapolis-Honeywell Regulator Co's. Brown Instruments Division. He says customers are demanding "completely integrated" control systems. And they want single manufacturer responsibility.

METAL CANS SHOW RECORD LEVELS of shipments for the first 8 months of 1961. Shipments totaled 3.3 million tons, up 4 pct over the same period last year. This is about 11,000 tons ahead of record-year 1959.

THE FARM EQUIPMENT INDUSTRY OUTLOOK for 1962 is good. This is the view of S. W. White Jr., president of Oliver Corp. He sees a 5 pct increase in retail sales over 1961. His outlook is based on a 1961 realized net farm income about 10 pct higher than last year, and on farmers' needs for bigger, technologically-improved machinery to lower unit production costs.



for safety's sake there's Carlson Stainless Plate in this Spent Fuel Shipping Cask

One of a group of Spent Fuel Shipping Casks designed and fabricated by Knapp Mills Incorporated for General Electric Company.

Photo courtesy of Knapp Mills Incorporated.

Spent atomic fuel is "down but not out." Containing unused uranium, it still must be handled safely and surely in being moved by rail, boat, or truck to recovery stations throughout the country.

Carlson Type 304 stainless steel plate was used in various parts of these shipping casks. Designed and fabricated by Knapp Mills Incorporated of Wilmington, Delaware, each cask weighs approximately 125 tons.

For maximum assurance—whether you build chemical, process, nuclear, missile, or aircraft equipment—specify dependable Carlson stainless steel plate. Specialists produce the material to meet your exact specifications. Your fabrication is easier—true-up and finish-welding is done quickly and efficiently. This, plus prompt delivery, is the total Carlson service you can count on—write, wire or phone today for complete information and assistance.

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Rise in Plant Accident Costs Spurs Industry Safety Drive

While the number of industrial accidents is not increasing, industry is out to beat rising accident costs.

As a result, the search is on for a sound way to measure plant safety programs. Various approaches are now used.
By K. W. Bennett

■ Industrial accidents will cost $2.2 billion this year. The figure can be doubled if indirect costs are included.

The number of accidents has been reduced—but during the last ten years the days lost per disability have gone from 22 to 26.

Fewer, But More Costly—Safety engineers can point to a steady decline in accidents reported. But though accidents sink in number, it's been a fight to hold accident costs to a 100 million average annual gain since 1955.

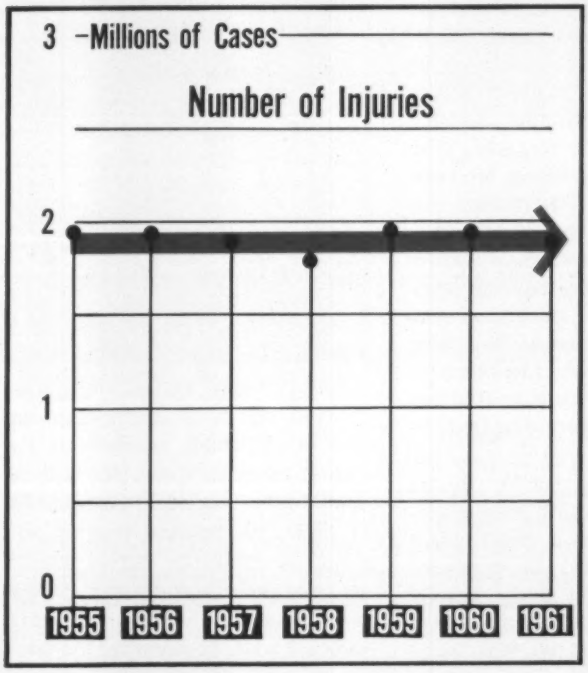
What's causing the boost, and how to stop it, has touched off a growing disagreement among safety men.

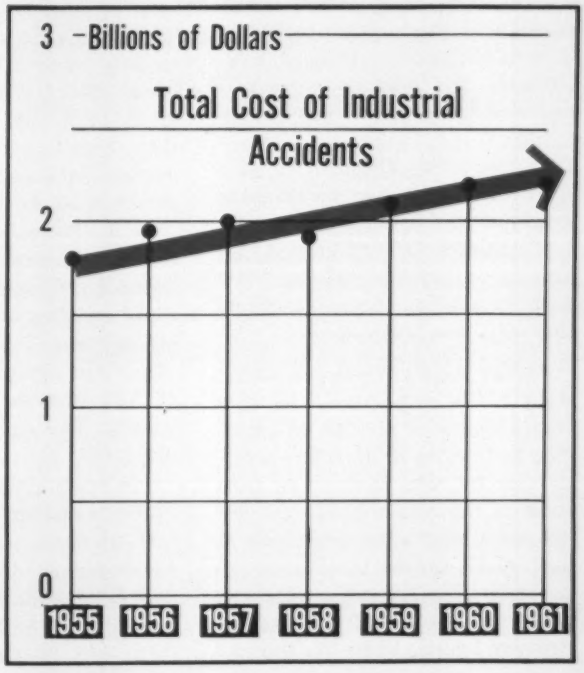
Insurance companies, which pick up a growing tab, point out two causes for cost gains. The head of the industrial department of a major workmen's compensation insurance business comments, "In the area of new materials, chemicals alone introduce 4000 new compounds a year, many of them toxic. We're giving coverage on radioactive materials, plasma arc, superspeed cutting tools, and toxic metals like beryllium which are in growing use."

Severity Causes Concern—"Secondly, we believe that, if accidents are fewer, severity is higher. Many plant safety men argue this isn't true. It's come out not only in our statistics, but some corporations are getting the same figures. Medical and compensation costs aren't the only thing that's rising. So's the severity rate."

If safety engineers disagree that the severity rate is rising, they will agree that some new gages of plant

Accident Rate Holds Steady, But Costs Climb





"I can't go into a plant without seeing people do things that set my hair on end."—..an insurance investigator.

safety are needed.

The most common measure of safety programs today is accident frequency (number of lost-time injuries per million manhours). A test that is growing is the severity rate (time lost due to injury). A safety statistician adds: "Too many plants, and not small ones either, are still going by guess and by gosh."

Combined Rates Used—A combination of frequency and severity rates is gaining in use. Top safety men suggest a ratio between the two is the figure to study. The ratio confirms, in at least two studies, that accident severity is rising. A safety engineer says, "This means we're making only marginal gains. We're reducing low severity injuries. We're not knocking down severity rates. And that's where it hurts."

With safety measurement debated and all methods up for challenge, General Electric Co., through J. V. Grimaldi, has offered a potential tool that could be a key breakthrough.

Certainly, Mr Grimaldi is of a stature that will give considerable weight to his findings. At the recent National Safety Congress, his election as president of the 7300 member American Society of Safety Engineers was announced.

Predict Injury Upsurge?—After study of 38 corporations, he concluded that it is possible to anticipate an upswing in the injury severity rate by nine months. At least some of the data suggests the system might give a warning signal as long as 12 months in advance.

Rather than leaning on accident data, the GE method uses production cost figures. Items like the cost of reworking, scrap losses, equipment maintenance will rise before accident severity goes up.

If the GE approach seems radical, a number of plant safety men agree it's been too carefully documented to be far off target and it offers too much potential to be ignored.

Critics say safety engineers need standard data which will give them an average accident rate for their entire industry. If measuring gets too complex, they say, plants can't submit standard results. But many who say this are already using nonstandard measurement themselves. And they admit the number of lost-time accidents in a plant is often a poor guide to which way the safety program is going.

Near-Accidents Listed—As an example of the combined approach used by many large metalworkers, T. A. Sullivan, A. O. Smith Corp., recently reported the tabulation of "near-accidents" at a plant. Supervisors keep tabs on the accidents that 'didn't quite happen.' The method gives more figures for evaluating program effectiveness.

G. L. Bowen, American Radiator & Standard Sanitary Corp., warns that the safety engineer is already spending too much time adding numbers. He should be selling safety. His approach: Measurement of total injuries against disabling injuries. This is charted against injury costs.

It's worth noting that Mr. Bowen mentions management's keen awareness of costs. As a result, plant accident data must be presented in a form that will give a quickly understandable cost picture; and the data must be material that won't tie the safety man to an adding machine. Since manufacturing cost data are already prepared, they offer the safety man a set of numbers that he can get without burning manhours gathering extra material.

Other Methods Used—There's another measure of safety cost developed by American Standard: The ratio of accident cost per $100 of paperwork.

A measure applied and backed by advocates who say it is a better measure of a safety program than accident frequency is an accident severity point scale. Standard Oil of Ohio is mentioned as a pioneer in this area. Points are assigned from 25 for death, down to one point for two visits to a doctor by the injured worker. The number of points is plotted against the number of hours workers are exposed to accident risk to give a rate.

Here's a slightly different approach to use of the frequency rate: The plant safety men record all accidents, not merely lost time accidents. Borrowing a page from statistical quality control work they chart monthly averages between an upper and lower limit, usually twice the standard deviation of the mean. When the curve wanders above the upper limit, it's time to build a fire under the plant safety program.

Insurance Rates Drop — Safety men are their own sharpest critics. National Safety Council statistics suggest a worker is safer at work than on his way there or at home.

Employers Mutuals of Wausau, one of the top three U. S. insurance businesses offering workmen's compensation coverage, grossed $77 million in earned premiums on compensation last year.

The battle for a plant safety program measurement device that can stop unpredictable accidents is no teapot tempest. The $100 million annual gain in accident costs halted in 1960. It's believed that an advance in industrial output would see that gain reappearing. Safety men agree that proper measuring tools are a key in stemming the tide.

Will Anti-Business Image Fade?

Administration Launches Close-Harmony Drive

Treasury Secretary Dillon leads new line with plea that both government-industry must share the responsibility.

Business leaders are impressed but remain cautious.
By R. W. Crosby

■ The Kennedy Administration is taking a new line in dealing with businessmen. The new line tells businessmen not only what they can do for their government, but what their government can and is doing for them.

The new line represents the Administration's drive to change the anti-business image it has created in businessmen's minds.

Administration spokesmen, from the cabinet level down the line, are carrying the message to businessmen. They say the Administration

HODGES: Seeks tax cuts.

can or is doing these things for business:

Reform—1. Starting depreciation reform for machinery, as evidenced by lowering of depreciable lives for textile equipment.

2. Trying to insure no tax increases become necessary.

3. Giving "full support" to the flat, across-the-board investment credit plan for new plant and equipment.

4. Instituting a comprehensive new insurance program for U. S. exporters.

5. Trying to hold the U. S. budget in balance and fostering a sound fiscal policy.

6. Expanding services to the businessman to be more helpful to foreign investment overseas and setting up new aids for businessmen at home.

In Return — The Administration expects businessmen to do a few things in return. Businessmen are being asked to:

1. Refrain from increasing prices.

2. Outsell foreign competitors and maintain a trade surplus of exports over imports.

3. Take risks in business ventures in underdeveloped countries.

4. Help find good men to manage the foreign aid program.

5. Promote Civil Defense preparedness.

Lead Drive—Leading the President's drive for a better relationship between business and government are top cabinet members, including Labor Secretary Arthur Goldberg, Commerce Secretary Luther Hodges and Treasury Secretary Douglas Dillon.

Goldberg asserts to businessmen that "if any tag" applies to the Administration it is "pro-business."

Hodges goes so far as to call for tax cuts to allow businessmen to reinvest more profits.

But the real leader of the move to refute the "anti-business" label is Treasury Secretary Dillon. His political affiliation, Republican, and his former business interest, banker, make him a natural.

Dillon's Role—Dillon has spearheaded the attack, taking the line that government and industry must "share responsibility" for the nation's future to businessmen across the country.

DILLON: Wants cooperation.

He told the top-level Business Council that carrying our economy forward "calls for close cooperation between government and the business community."

In foreign trade, he said, the government will give businessmen export guarantees comparable to foreign competitors. Businessmen must supply "aggressive enterprise," by "maintaining a trade surplus" and being willing to "take risks."

Fiscal policy, he said, will get a lift from the President's submission of a balanced budget to Congress—next year. And business investment through federal tax incentives will stabilize the economy, he adds. But sound fiscal policy cannot be attained without an end to "unjustified price increases."

Not Convinced—Business leaders are impressed with the new line. But they are not completely convinced that the objectives can be attained.

Semiconductors Hunt Markets

The Next Industry Breakthrough May Be in Markets

Electronics men look to new uses in industrial power field for a widened market.

Semiconductors are too dependent on military orders. Makers aim for more stable and profitable industry sales.

By G. J. McManus

■ The next big breakthrough for semiconductors may involve markets rather than technology.

New applications in the industrial power field are regarded by some as the key to more stable and profitable sales. Electronics men are still rushing the future in their technical programs; but there is growing interest in the commercial market and in conventional marketing generally.

Behind this interest is the feeling industrial systems offer a vast potential for semiconductor sales. Also, component makers would like to get away from the headaches that have hit the big markets for these devices. And, finally, they realize both these aims call for important adjustments by suppliers and potential customers.

Headway—Considerable progress has been made. The power field was opened up in 1955, with the development of silicon as a semiconductor. Prior to this, germanium was used and was limited to relatively low power ratings.

With silicon in the picture, producers have been boosting the capacities of semiconductors over the past five years and have been adding new refinements. Power transistors were introduced in 1958. Controlled silicon rectifiers came out in 1960. There has been a steady push toward higher ratings.

Impact of these developments is described by Westinghouse Electric Corp., which has concentrated on the power field from the start. New automotive generating systems are taking large quantities of diodes, says Westinghouse; voltage stacks are going into electronic precipitators; power transistors and controlled rectifiers are being used in ultrasonic cleaning and lighting systems.

Terminology Snag—However, semiconductor men admit there are still serious difficulties in their marketing programs. Plant people are still dismayed by the special language and knowledge that has built up in the electronics industry.

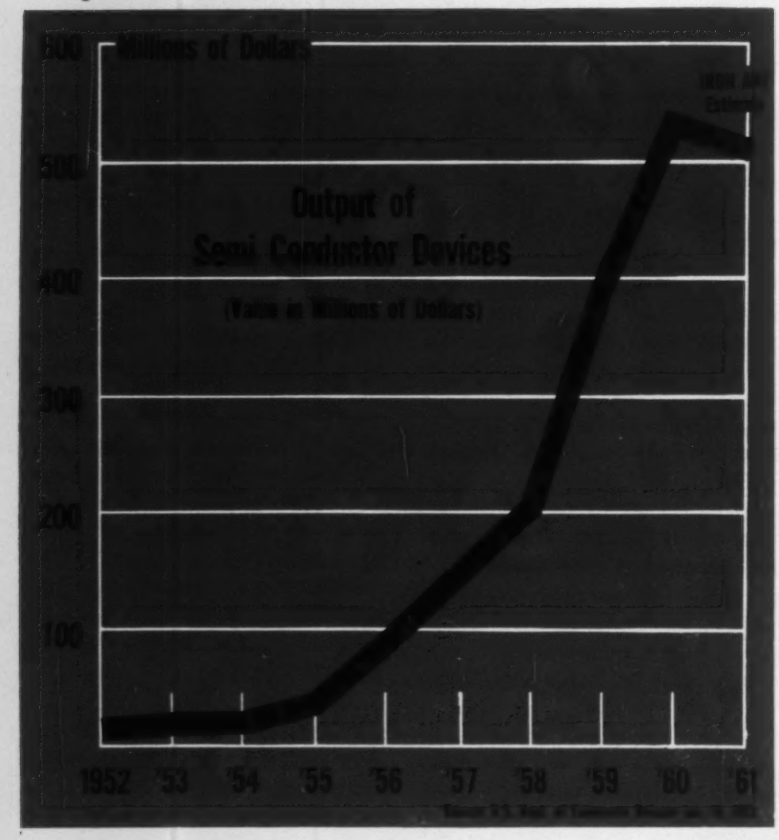
"One of our problems is getting people to understand the terms," says L. L. Grant, manager of marketing for the Westinghouse semiconductor department at Youngwood, Pa.

He explains semiconductors are basically switches. In industrial applications, they are used to handle the conventional jobs of rectifying, amplifying and converting power.

Industry Lag—Apart from terminology, however, there is a basic technological gap. One systems man says industry is 10 or 15 years behind the military in electronic development. Mr. Grant cites a recent survey to the effect that 75 pct of the electronic engineers in the country are tied up in some form of government work.

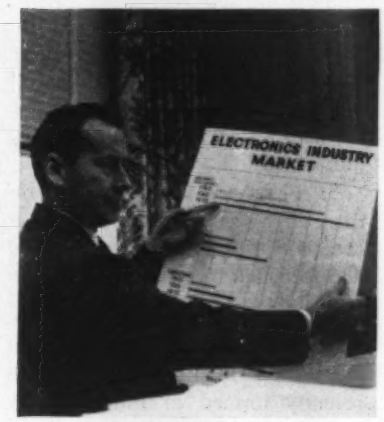
Right now, the power end of electronics is sharing in general price

Explosion, Then a Lull



problems. On a unit basis, semiconductor sales are running 30 to 35 pct ahead of 1960. With business improving, the full year may show a gain of more than 40 pct.

However, dollar sales are down 4 pct from last year's total of $535 million. The dollar lag is due mostly



WESTINGHOUSE'S GRANT: "One of our problems is terms."

to a price skid that cut 20 pct off average margins and went deeper on individual products. No recovery is expected before next year.

Over-Suppy—Price problems are explained partly by excess capacity. Demand for semiconductors has been growing rapidly but so has supply. More than 60 companies have entered the field. In 1960, defense needs did not develop on the mass basis expected. Military programs take nearly half the semiconductors made and supply shot ahead of demand at this point.

"The marketing end of the electronics industry has not matured," says N. Altman, director of marketing for Norbatrol Electronics Corp. Norbatrol makes static control systems for industry primarily and also does military work.

Mr. Altman feels the market development has suffered from the technical orientation of the industry. A company will come up with an "engineering curiosity" and tell the sales force to go out and sell it. For industrial selling, he feels, there must be more emphasis on adopting new discoveries to the practical needs of the customer.

ASM Begins Drive On Talent Shortage

New ASM head reveals plans for three-pronged attack throughout the nation.

Dr. Swartz says technical people needed at all levels.
By A. E. Fleming

■ "I feel personally that we're in an era of shortage of competent technical people at all levels, from the man who can set up a piece of equipment to the man who can operate a company."

This is the view of Dr. C. E. Swartz, nationally known consulting metallurgist from Hinsdale, Ill., who is president of the American Society for Metals for 1961-62.

In Detroit last week for the 43rd National Metal Congress and Exposition, Dr. Swartz, a 27-year society member, said ASM recognizes the shortage of technical talent and will strive to do three things in each of 117 chapters in the coming year.

ASM's Plans—These are to upgrade individuals so they can do better in the jobs they are in and to prepare them for advancement to more responsible positions; to help technicians become better acquainted with other technical people in their area, to help them swap information and air gripes; to provide technicians with experience in managing others.

"Colleges and technical schools are doing fine work today," emphasizes Dr. Swartz, himself holder of a B. S. degree from the University of Illinois, and master's and doctorate from the University of Wisconsin. "But there must be an organization like ASM which offers additional knowledge and experience to those who must keep studying after they leave college."

The Society offers over 20 courses, according to its president, which are taken by individual correspondents, by chapter groups or by plant groups. "Participation has grown by leaps and bounds in the last four or five years," he says.

All Types—He says the 34,000 to 35,000 members of the society include all types of people who are interested in metals, including executives, salesmen and the man working in the shop or at the furnace.

Although there are individual members all over the world, ASM has chapters only in the U. S. and Canada. "My belief is we'll have a foreign chapter before the year is out," forecasts Dr. Swartz. "I wouldn't be surprised if we had one in Mexico a year from now."

He doesn't look for any chapters in Europe, however, because "they've got many societies of their own to which many Americans belong."

He believes that if the Society can help orient technical personnel in foreign areas to U. S. techniques, they would be more apt to look to the U. S. for equipment such as rolling mills and furnaces.

More Competition—For the metal industry in the next year, Dr. Swartz predicts stiffer internal competition with metal vying against metal in many areas, and more rugged external competition from non-metals.

"We'll also continue to see a jockeying for position in metalworking techniques as new and different ways to weld, join and form develop. But this will be healthy and will mean progress for the metal industry," he says. "But I must stress that the metal industry needs more trained people at all levels to help metals not only to hold their own but to gain new markets."

Ready-Made Plants Go Abroad

Packaged Plants May Stimulate Underdeveloped Nations

Off - the - shelf units have aroused interest in Africa, South America and many underdeveloped nations.

The concept is that industry has to get started in a small way, not with heavy industry.
By G. J. McManus

■ Where do you start to develop a new nation?

World planners as well as businessmen seem to be returning to the notion that a bootstrap operation should follow the sequence of small business first, then big business and finally basic, heavy industry.

The progression builds on growing markets and income.

This order was followed in the development of the U. S. But it has been reversed by some who are attempting to duplicate our industrial complex. The Russians have stressed heavy industry as the starting point for their buildup. The ultimate consumer market in Russia must wait for the program to work out to them. In this scheme, supply is geared to planned needs rather than immediate markets.

Communist Approach—Many of the young countries of Africa and Asia have been attracted by the Communist approach.

"The first things they want are a steel mill, a power system and an airline," growls one world trader.

There is still interest in these prestige projects and in some cases they can be justified. However, there are signs development is starting to follow more modest and commercially realistic lines.

Here are a few indicators:

Realistic Approach—1. An American producer of process machinery is getting good response from a marketing program aimed at small business groups in new countries.

2. American studies in Africa and Asia have spelled out the fact that a country must have a domestic market for steel before an integrated mill is feasible.

3. Plans and reports of the Indian government point to new respect for private enterprise generally and for small business in particular.

Pittsburgh Firm — Among those backing the old idea of development is Packaged Plants, Inc., which was recently formed in Pittsburgh by J. P. Devine Mfg. Co. and related groups. PPI is built around the concept that many of the depressed areas are ready and eager for small manufacturing operations.

To get such operations started, says the company, there is very often a need for a ready-made plant. The kind of volume involved will not support design and engineering on an individual basis. What's needed, the company feels, is a fully-designed unit, available off the shelf at a firm price.

Accordingly, PPI has set out to prepare a line of packaged process plants. The first of these was readied about a month ago. It is a soap plant with capacity for 300,000 lb of quality product a year. The plant is designed for operating simplicity. Installation and training help are included in the sales package.

Attracts Interest—PPI says the first plant has already attracted live interest in Central America and Africa. The company is considering the addition of milk processing, wire forming, ice making and other machines.

Thinking behind this effort is explained by G. R. Cox, president of PPI. The company's first interest is in making money, says Mr. Cox; it feels packaged plants can be sold

PPI'S COX: Depressed areas are ready and eager for small manufacturing operations. Needed: A fully-designed unit, available off the shelf.

and operated profitably. The soap making unit, for example, is designed to pay for itself in 25 years' service.

However, Mr. Cox feels the small business approach is also sound from the foreign country's standpoint as a means of solid development. He points out the big need in underdeveloped areas is for business groups that can produce sustained growth and added income.

Unskilled Labor—"The only jobs the African can handle are unskilled," he says.

But even the most depressed countries have people who could step up as managers of small operations, says Mr. Cox. He cites a report from Sudan: The country has a moneyed class made up of merchants, importers and manufacturers agents.

These people have the capital, markets, and urge to operate plants, says the report. Some have already acquired permits to make things like soap. Mr. Cox feels the market potential of this situation can be triggered with a little intelligent help from the outside.

The Indian government has recently shown interest in this viewpoint. India sent a commission to this country and to Germany to analyze the causes of rapid postwar growth. In each case, the visitors found small business to be a vital factor in overall economic strength.

Need for Markets — Importance of immediate markets is also stressed by Koppers Co., Inc. Koppers is participating in the integrated mill being built in Turkey. It is active in studies of mills proposed for Nigeria and other sites.

A Koppers official says a detailed market study was made before the Turkish project was started. The study turned up 634 metalworking companies with capacity for processing 610,000 tons of steel. It showed an immediate need for 805,000 tons and a need for 1.2 million tons by 1963. Finally, it was found Turkey had imported up to 70 pct of its steel to meet domestic requirements.

New Export Rules Aid Foreign Sales

U. S. companies will be able to get export loans and insurance easier and faster.

Types of loans made to metalworking are helped the most.
By J. D. Baxter

▪ There is hard-core meaning to metalworking in President Kennedy's announcement last week on new aid to exporters. This applies to companies that are "export-minded" as well as companies that are old hands at exporting.

Small and medium-sized metalworking companies will get the biggest boost from the new regulations. Short-term credits for export loans have been made easier to get.

Medium-term credit rules are changed. And chief exports in this field are semi-finished materials and products, consumer durable goods and capital equipment.

Real Meaning—Stripped bare of the language of high finance, here's what the new changes in Export-Import Bank (Eximbank) mean:

Companies can now turn to their regular bank contacts to get medium-term loans (6 months to 5 years) to export.

Loans will be "guaranteed" against foreign political risks (war, dollar conversion, etc.) by Eximbank directly through local banks.

Exporters will not be liable on bank loans if their foreign buyers don't pay up.

Exporters can now tell foreign buyers they need only 10 pct down on purchases made from them. Previously, 20 pct down was required.

Companies, by January 1, 1962, will be able to turn to their regular insurance brokers to get credit risk insurance to back up their short-term loan applications.

Red Tape Cut — These changes put the U. S. exporter on a par with foreign competitors in finance and guarantees. And he should be able to close a foreign sale quicker and easier than ever before. He will be dealing directly with his regular bankers and insurance brokers. Nowhere is he enmeshed in Washington red-tape.

"This greatly simplifies things for the export-minded," R. H. Rowntree, Eximbank chief of economics, told The IRON AGE. "Before these changes, an exporter would have to come to Washington to see us. We have no branch offices."

Also, he points out, separate policies had to be issued by Eximbank to exporters for each of the risks involved. A comprehensive policy will now cover these risks.

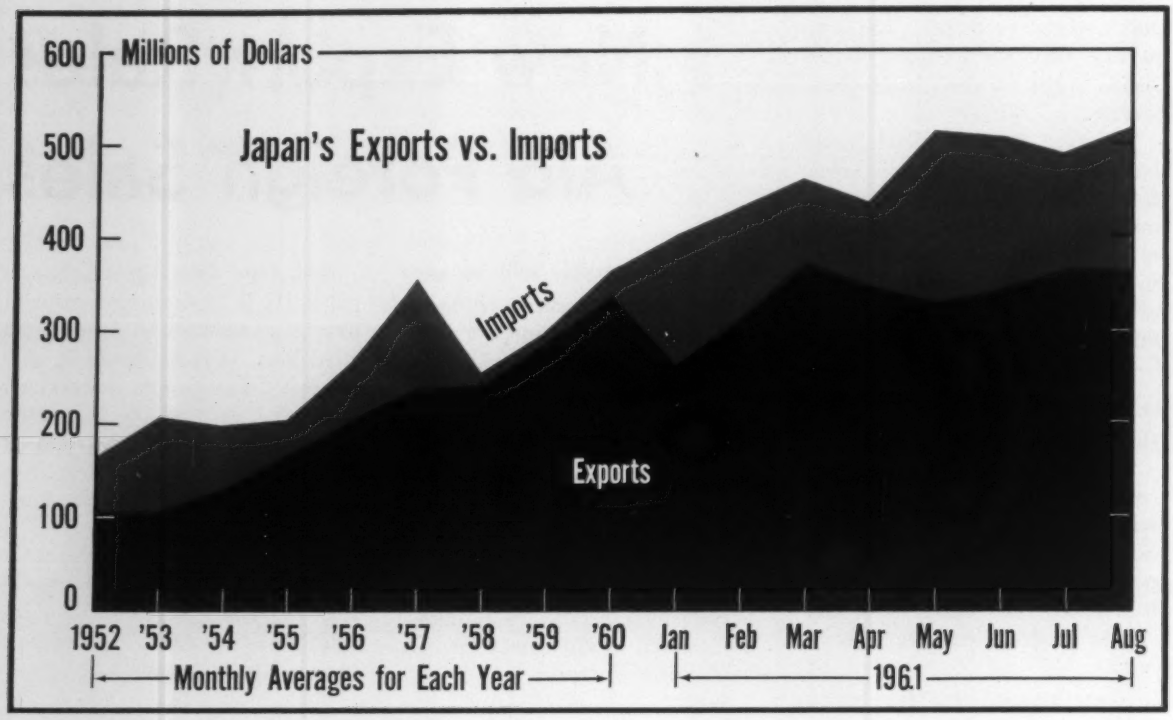
"We know," says Mr. Rowntree, "that this old arrangement caused a lot of prospective exporters to give up thoughts of exporting." He intimates this may have been the toughest part for smaller companies in making a foreign sale.

Company Size—How big does a company have to be to qualify for Eximbank export aid? How big does a single transaction have to be?

Here is Mr. Rowntree's answer: "There are no minimums entailed. We once loaned $500 to a U. S. company to sell a plow to a customer in Brazil. And if a company comes along and wants less, it can get it."

Costs—How about the cost of loans and guarantees through Eximbank?

"When the entire program gets moving, some time after the start of the year," says Mr. Rowntree, "a borrower should be able to get a loan at about 6 pct interest. And his risk insurance costs should run between 1½ to 2 pct."



Report From Tokyo

Japan Fights Balance of Trade

But Increased Trade With Red China Is Ruled Out

Japan is finding itself in a situation similar to that of the U. S.—a high-cost producer.

In spite of a potential fat market in Red China, Japan is not likely to develop this market.
By Tom Campbell

■ Japan is a long way from serious trading with Red China. Hopes by some—or suspicions by others—that trade will pick up soon between these two countries are groundless.

Japan's exports to Red China last year were less than one tenth of one per cent of total Japanese exports. In the period from 1930 to 1939, Japan's exports to China averaged 22 pct annually. Before the breakdown in relations between Japan and Red China in the late 1950's, exports to China were but 2.7 pct of Japan's total exports.

Others Do More—Japan is at the bottom of the list in exports to Red China. In 1959, West Germany shipped 32 times more, in dollars, to Red China than did Japan. United Kingdom shipped 18 times more than Japan; France 10 times more; Italy 9 times more; and Switzerland 8 times more. There are good reasons for this.

The feeling between Red China and Japan is not friendly. Aside from this, there are other reasons why it will be a long time before trade between the two nations even approaches what it was before World War II. Here are some reasons:

1. Japan is a highly capitalistic nation and its managers and rulers do not warm up to Communism.

2. Japan hopes to step up its trade with other Asiatic nations before Red China becomes a threat to this goal.

3. Trade with China (mainland) before the war was up because Japan controlled Manchuria and other areas and brought large tonnages of iron ore and coal from there to Japan proper. Today, this is not true nor will it come true as long as Red China needs its iron ore and coal for its own expansion —which it does.

4. Japan hopes to sell heavy machinery to under-developed nations (low-income nations) and light ma-

chinery to developed (high-income) nations.

The Anchor — With Japan the Free World's anchor in East Asia, it is clear that there will be no change in this status unless extremely adverse economic or political conditions arise in Japan—conditions which would force it to step up trade with Red China and Soviet Russia.

Because Japan has now passed the reconstruction phase of her recovery, it becomes more than necessary for her to step up her exports. She won't overload the U. S. with her products. Japan wants to avoid repercussions.

She can't, as yet, stir up much trade with Red Russia. That showed up when Soviet First Deputy Premier Anastas Mikoyan showed up in Tokyo and insulted Japan and Japanese culture right and left.

Trade With U. S.—Japan must keep shipping to the U. S. in line with current percentages of her total exports. She must compete tirelessly with West Germany, United Kingdom, France, and Italy, right in her own backyard. While she is doing this, she must try to increase her trade with South America, Canada, and Australia. At the same time, Japan must try to match the exuberance of Hong Kong, Pakistan, Eastern Europe and other competitors whose labor costs are now lower—relatively—than hers.

One of the major questions being discussed this week in Japan by the U. S. cabinet officials and leading Japanese government officials concerns Japan's place in world trade. It may never be made public, but it is certain that the specter of Japan's going Communist in years to come, because of deterrents to her exporing to the Free World, will be raised. Present Japanese leaders would never admit to even a remote chance of growth of Communism in Japan. But they are older men, now. Some younger people may think otherwise.

Improvements Needed — Before questions of Communist growth in Japan come to the home front, that nation must quickly concentrate on lower costs and better techniques for heavy machinery exports to her neighboring countries in Asia. Figures which show a heavy exportation of durable goods by Japan are misleading. The inclusion of shipbuilding hides the fact that autos, aircraft and machinery are not doing well in exports.

Until such time as Japan improves her technological standards for machinery and machine tools, and until she offsets her increases in wage and fringe costs, she will find it more than difficult to expand her exports. But she has to do this because for many months, now, her deficit in international payments has been growing. That is why the government is taking fast and serious action to forestall further danger to reserves as well as trying to build safeguards against damaging inflation in the future.

Japan's World Trade Problems

In this second of a two-part report from Japan, Editor-in-Chief Tom Campbell discusses Japan's long-range world trade problems. The first report (Oct. 26) analyzed Japan's current "go slow" policies in cutting back exports.

Future Plans—Japan had hopes —and still has— to cash in on the urgent need of under-developed nations to buy heavy machinery and equipment. Japan's wages in the middle sector of her industry are rising. Labor costs will continue to rise. So, Japan finds herself—relatively—in somewhat the same position as does the U. S.

In the U. S., high wages, pressure on prices, and lack of sufficient capital to replace machinery and equipment with cost-saving and more modern installations make world trade competition rugged. The same goes—and will go—for Japan. One way out of this will be a concerted drive to sell to Southeast Asia and eventually to supply machinery and equipment to Africa.

No Trend to China—When Japan's troubles are understood, it is clear that she is not going to expand her trade with China for a long time. She must offset this by stepping up her trade with other Asian nations.

Although Japan has had an unusually strong comeback from war damage—her economy has grown faster than any other nation's in recent years—part of this has been due to reconstruction and part to export of labor-intensive (low-cost labor) products. Other nations—in Asia and, soon, Africa—which have an abundance of low-cost labor, while Japan's labor costs are rapidly rising, will make it tougher for Japan in this competitive race.

Conclusions — Based on talks with leading Japanese government people and industrialists, the following conclusions about Japan's relations vis-a-vis Red China and the U. S. are clear.

1. Japan does and will lean far toward the Free Nations.

2. There will be no dumping or excessive exporting to the U. S. Problems will be worked out amicably between both nations. Exports to the U. S., in pct of total Japanese exports, will not change between now and 1970.

3. Increased exports will flow to Southeast Asia. But exports to Red China will be but a fraction of total Japanese exports for some time.

4. The hard core of Communists in Japan is small. It does not represent the majority opinion.

5. Japan will have soon serious problems of high-cost heavy products, rising wages, impending shortage of labor, and a growing high-income-per-capita population.

6. Despite the difference in culture, the Japanese favor Americans and, with a choice, pick Americans, their techniques, and their products.

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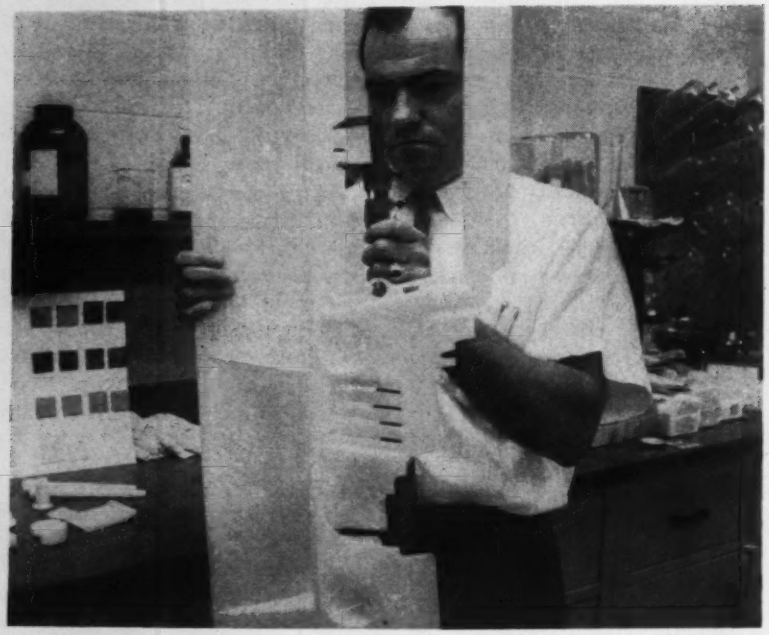
New Plastics Bid for New Markets



PLASTIC DASH: Plastics based on new chemical polymers are bidding for new markets in such fields as automobiles, construction, appliances, packaging. Here a plastic auto dashboard molded from Celcon acetal copolymer is measured at Celanese Corp.'s new Polymer Dev. Center in N. J.

Chrysler Talks Race Strike Deadline

There could be a strike at Chrysler Corp. starting this Thursday night.

The UAW executive board says if no national agreement is reached by 8 P. M. Tuesday, Oct. 31, it will give Chrysler a 48-hour notice of contract termination.

Stumbling block could be the non-economic part of the contract. Only a few economic issues are left to clear away. Chrysler's economic bid is similar to contracts gained at GM and Ford.

But serious non-economic problems arise from Chrysler's desire for greater work productivity to become more competitive. So far in 1961 the company has lost $20.5 million. The union is against a "speedup."

Also, Chrysler says it has one union committeeman per 100 workers compared with one per 250 at Ford and GM. The company wants this ratio cut.

As of press time only 10 of Chrysler's 88 locals had yet to reach agreement. Four of the 10 are key plants.

Also still to be straightened out is final language on agreements of national issues on pensions, insurance and supplemental unemployment benefits.

Two Metal Fastener Companies Indicted

Two large metal fastener companies face a Federal court trial in Detroit on charges of price fixing and monopoly. Huck Manufacturing Co., of Detroit, and Townsend Co., of Beaver Falls, Pa., have been indicted on charges of fixing prices and monopolizing production of lock bolts.

Attorney General Robert Kennedy announced the indictment was returned by a Federal Grand Jury. The indictment charges that the companies have conspired to monopolize the $16 million a year lock bolt business in the U. S. since 1954. The indictment says this was done by fixing prices and agreeing to limit patents.

Huck and Townsend are the nation's largest manufacturers of lock bolts, metal fasteners for airplanes, trucks, ships and railroad cars.

Trade Program Faces Compromise

President Kennedy may have to make some compromises to get his liberalized U. S. foreign trade program through Congress next year.

Commerce Secretary Luther Hodges personally believes reciprocal trade legislation will have to take care of some extreme cases of industries suffering from foreign imports.

Protection clauses in the foreign trade program for some specific industries may be allowed by the President to get votes from some protectionist congressmen.

$40 Million Atlas Quebec Mill Okayed

Atlas Steels Ltd. of Canada has reached agreement with the provincial government of Quebec. It will go ahead with plans for a $40 million mill at Tracy, Quebec.

Construction will start immediately on the 48-in. stainless steel strip and sheet facility. It will be finished within three years.

U. S. Tools Slated For Southeast Asia

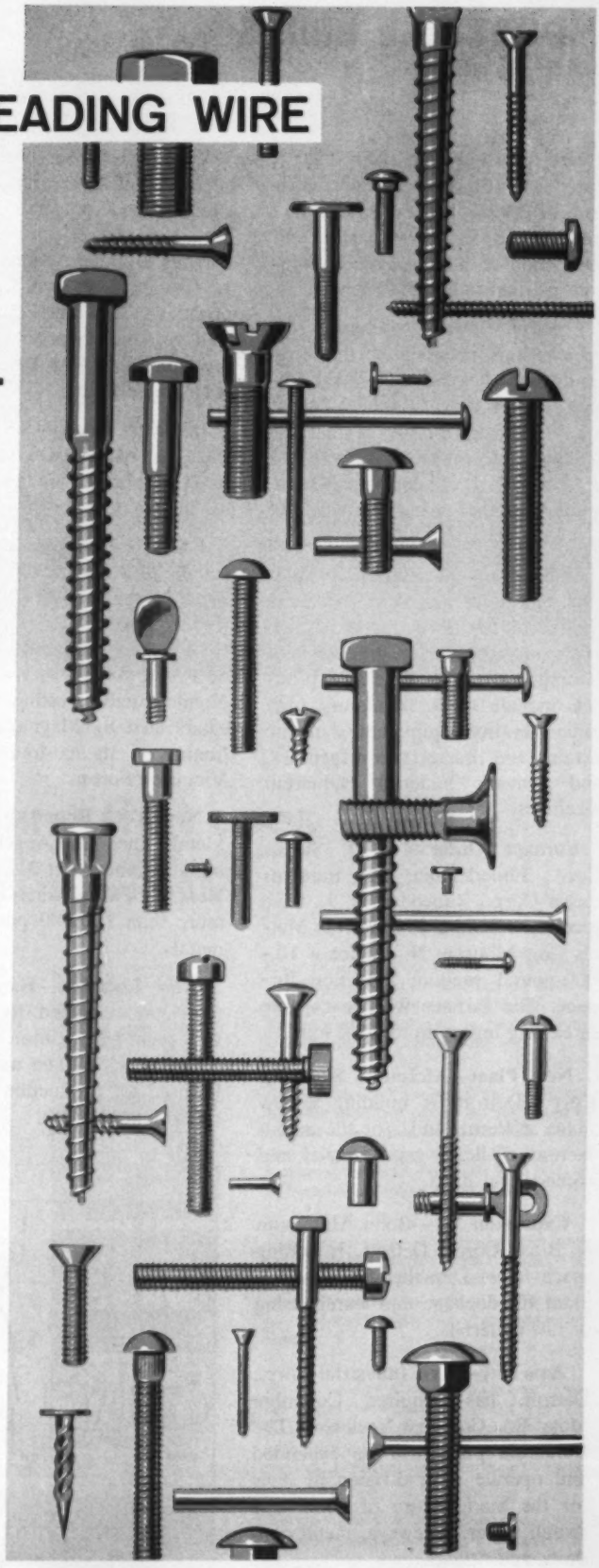
Dept. of Commerce is opening a U. S. trade center at Bangkok, Thailand, next spring. It will assist U. S. industries to increase their exports to Southeast Asia.

Two exhibits are scheduled to follow the opening. One will feature light industrial woodworking machinery. The second will display farm machinery, automotive equipment, and machine tools.

The center will aid companies doing business in Thailand, Burma, Malaya, Cambodia, Laos, Viet-Nam, and Singapore.

ANACONDA COLD-HEADING WIRE

take a new look at the way you're making these parts...



Cold-heading and upsetting operations require specific qualities in wire to obtain the optimum in quality and the most favorable unit cost.

Anaconda Cold-Heading Wire has those qualities . . . a greater range of alloys . . . a wider range of finer characteristics to satisfy almost any requirement for a cold-headed part. These include corrosion resistance, toughness, tensile and fatigue strengths, electrical conductivity, and good color matching with other metals.

And to further improve the qualities of Anaconda Cold-Heading Wire, new fabricating methods have been developed to produce wire with a superfine-grain structure and greatly improved physical and mechanical properties. Today these new manufacturing methods can be applied to both brass and phosphor bronze wire.

Certainly it will pay you to take a new look at the way you are making these parts. Among the many alloys available in cold-heading wire form, Anaconda alone has Formbrite®, Duraflex®, and Everdur®.

Publication B-33 gives complete details. Write for your copy—or call on our Metallurgical Department to help you with your problems. Anaconda has specialists in this field to help you at any time. See your Anaconda representative, or write: Anaconda American Brass Co., Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

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COPPER AND COPPER ALLOY COLD-HEADING WIRE

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AMERICAN BRASS COMPANY

INDUSTRIAL BRIEFS

New Division—Multi-Flex Seals, Inc., New York City, is now a division of Metal Process Corp. and will expand its development and production of high pressure, vibration-resistant seals and fasteners.

Egleston Award — Charles M. Brinckerhoff, president of the Anaconda Co., has been awarded Columbia University's Egleston Medal for "distinguished engineering achievement." Award is presented in honor of Thomas Egleston, founder of the nation's first School of Mines in 1864.

In Business—Machine Dynamics Inc., has been formed at Pasadena, Calif., for the development, design and manufacture of programmed environmental test facilities. Its products include shock simulators, high force vibration equipment, dynamic loading and pressurization facilities, and dynamic material evaluation machines.

Furnace Order — F. J. Stokes Corp., Philadelphia, and Inductotherm Corp., Rancocas, N. J., have received an order from Allvac Metals Co., Monroe, N. C., for a 10,000-pound vacuum induction furnace. The furnace will be capable of casting ingots up to 20 ft long.

New Plant—McIntosh Stamping Corp., Detroit, is building a new plant at Berne, Ind., for the manufacture of heavy-gage pressed and coined steel parts.

Expansion Set—Bohn Aluminum & Brass Corp., Detroit, is adding space to its Danville, Ill., Division plant for dockage and warehousing of raw materials.

Avis Buy—Avis Industrial Corp., Detroit, has acquired Columbia Metal Box Co., New York City. The Columbia plant will be expanded and operate as a division of Avis for the manufacture of panel and switch boxes, wireways, metal conduits, and fittings.

Election Results—Dan A. Mitchell, vice president/sales, Progressive Brass Mfg. Co., Tulsa, Okla., has been elected president of the Non-Ferrous Founders' Society. Elected as vice presidents were L. J. Andres, president, Lawran Foundry, Milwaukee, and George W. Stewart, president, East Bay Brass Foundry, Richmond, Calif.

Dedicates Plant—U. S. Industries, Inc., has dedicated a new 57,000-sq ft manufacturing and engineering facility at Silver Spring, Md.

Lambert Honored — Richard H. Lambert, associate director of the metals research laboratory at Carnegie Institute of Technology, has been named recipient of the A. V. de Forest Award by the Society for Nondestructive Testing. Award was established by Magnaflux Corp. in honor of its co-founder, Alfred Victor de Forest.

New York Bound — Continental Metals, Inc., Los Angeles, is opening a warehouse at 312 E. 95th St., New York City, where it will stock more than 100,000 pounds of rare metals.

New Location—Handy & Harman has relocated its New York City plant from Fulton St. to Mount Vernon, N. Y. The new plant will be used for production of a variety of karat gold alloys.

"He's a specialist."

Architects Award—The American Institute of Architects has announced nominations are open for the annual $25,000 R. S. Reynolds Memorial Award. The award is given to an architect who has designed a significant structure in which aluminum has been used creatively. It was established by Reynolds Metal Company in 1957. In addition to the $25,000, it includes an original piece of sculpture designed by a prominent contemporary artist.

New Department — Engelhard Industries, Inc., Newark, N. J., has formed a Semiconductor Materials Department specializing in precious and base metals. The new unit is at the firm's D. E. Makepeace Division, Attleboro, Mass.

New Line—Claver-Brooks Co., Milwaukee, plans to market a new line of small hot water boilers, in addition to the larger package boilers it has been manufacturing. The small boilers will be in the $300 to $3,000 price range.

Furnace Order — Inductotherm Linemelt Corp., Rancocas, N. J., has received an order for a $200,000 induction melting furnace system. It will be installed in a new plant of Valley Mfg. Co., Inc., a plumbing fixture firm, at Springfield, Mass.

Receives Loan — Ravens-Metal Products, Inc., has received a $200,000 loan from the Federal Government's Small Business Administration. The loan will enable the company to increase production at its Ellenboro, W. Va., plant and to introduce new models of aluminum trailers.

National Division — Eutectic Welding Alloys Corp. has formed a new National Accounts Division. Four technical representatives have been named to handle Eutectic's accounts nationally.

Hosts Conference — Hoeganaes Sponge Iron Corp., Riverton, N. J., was host to the annual Powder Metallurgy Clinic-Conference of The Metal Powder Industries Federation. Representatives of 24 manufacturers attended the session.

Ingot Mold Cars...

built to last by a company that uses them!

5 unique structural features make them better

Ingot Mold Cars take more punishment than perhaps any other cars in a modern steel plant. In the 40 years we have been making these cars for our own use, United States Steel has developed a number of features in structural design that assure longer life, less maintenance and dependable service.

Shown here is a typical 8-wheel, 200-ton capacity Ingot Mold Car. The advantages illustrated at the right—plus the rugged durability of all-welded rolled-steel construction—make any size USS Ingot Mold Car a profitable investment.

Our representative will be pleased to call at your convenience to discuss your requirements for this or any other type of industrial car. For more information, write to United States Steel, 525 William Penn Place, Pittsburg 30, Pennsylvania. USS is a registered trademark.

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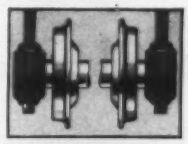
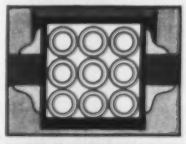
USS United States Steel

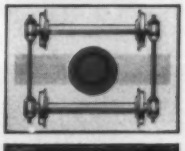


Anti-friction outboard bearings: High-capacity anti-friction bearings are located *outside* each of the car's eight wheels to minimize sidesway and to provide long, smooth-running performance.

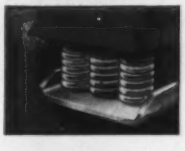


Seventy-two coil springs: Nine coil springs between each two wheels on both sides of the car—plus nine overload coils *inside* these—provide a total of 72 separate springs for a shock-absorbed *level* ride, so important in hauling molten metal.

High engineering safety factor: Designed for a 200-ton normal capacity load—including ingots, molds and stools—each car has a substantial built-in safety factor to withstand maximum ingot-stripping thrusts.



Oversize center plates: "Beefed-up" center plates between the trucks and car body are 18 inches in diameter—compared with the conventional 12 inches—to reduce the load per square inch on their surfaces.



Hot-metal shields: Curved end plates, long side skirts, and special drip shields protect the couplers, bearings and springs from runover molten metal and troublesome solidified drippings.

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30 types and over 10,247 sizes make Timken bearings the most complete line of tapered roller bearings.

The little bearing you almost missed sitting there on top of the big one is too small to fit on your little finger. It's used in the reel of a power mower, and it weighs only 2.6 ounces. The big one is a four-row mill roll-neck bearing, weighing over six tons.

Between these two extremes you'll find a Timken® tapered roller bearing to fit every combination of radial and thrust loads, for all kinds of mountings, and for virtually all operating conditions. This most complete line of tapered roller bearings is sold and serviced by graduate engineers who can help you select the one bearing, from hundreds of possibilities, that will give you the most for your bearing dollar.

Make sure you check with your Timken bearing representative. He can tell you which bearing is the most economical for your application. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.

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Make Your Recruiting Effective

In the battle to get the best technical and management material, you'll have to push campus recruiting programs.

While business is doing a better job in this area, there's still room for improvement.

■ Your recruiting practices, aimed at locating the best possible personnel, are increasingly important.

With the emphasis on technology and marketing, there's more hiring of creative scientists, technical specialists, and marketing experts. Better methods of selecting these highly skilled workers are needed. Management recruiting programs are getting better. But there's still room for improvement.

Lack of Understanding—In a recent review of recruiting practices, George S. Odiorne, of the University of Michigan's Bureau of Industrial Relations, points to "a lack of understanding between the university and the business world" on this matter.

"Company recruiters often reject the liberal arts graduate, avoid the nonconformist, mislead the student about work requirements, and don't know the future manpower needs of their own companies," he adds.

Where Business Fails — Specifically Dr. Odiorne charges corporations are often guilty of these faults in the eyes of college placement directors:

Lack of understanding of the youthful mind. "Even experienced recruiters come to the campus looking for 20-year old youngsters who act the way 40-year olds are supposed to act."

Failure to appreciate the organizational forms of the university. Not recognizing it as a community of scholars which is neither as bureaucratic nor as tightly disciplined as a corporation.

Lack of sympathy for the goals of a university, its orientation to the student first and others afterward.

University Blind Spots—On the other hand, Dr. Odiorne observes, recruiters say universities also have their faults. Some include: Most faculty members are aloof from business; colleges are unrealistic about the amount of money companies can spend on recruiting and employment; and they lack some appreciation of the profit motive of business.

In another recent study, the Bureau of National Affairs, Inc., discusses the methods used to find and recruit specialized personnel.

How Industry Recruits—Over 140 personnel executives were questioned on their recruiting practices. Among them the favorite recruiting method is advertising followed by technical or professional societies, and then on-campus recruiting. Field recruiting is used by 49 pct of the companies. Other recruiting methods mentioned include: Employment agencies, employee referral, and executive placement agencies.

Must the Boss Be Liked?

■ Is it necessary to be liked in order to get ahead as an executive?

Some interesting thoughts on this question are offered by Lon Barton, president of Cadillac Associates, Inc., Chicago-based executive recruiters.

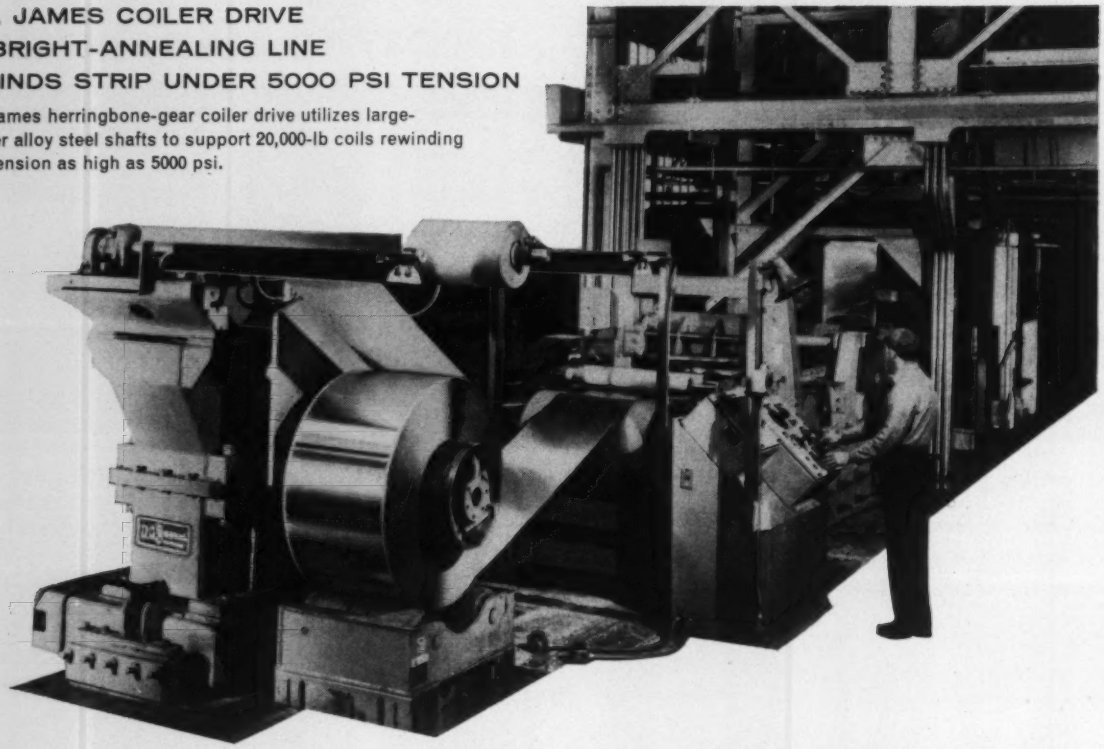
Likable and Available—According to Mr. Barton it all depends on whether you're on top or climbing the executive ladder. "No one really likes the man on top," he points out. "At the other end of the spectrum, the junior has to be liked by one and all. He must cultivate this liking on the part of others by being available, always, and at some personal sacrifice to himself— available both to the upper echelon, to his equals, and to the clerical staff."

Consider Job First — However Mr. Barton feels it's virtually impossible for a middle to higher executive to do his job right and be liked by everyone. At the highest level it's easier for the executive to be accommodating. One reason: The top executive has delegated much of his responsibility, or can budget his facilities to meet any needs that arise.

Instead of asking "Is it necessary to be liked to be a successful executive?" Mr. Barton prefers the axiom: Pick your friends wisely, but choose your enemies even more wisely.

D. O. JAMES COILER DRIVE ON BRIGHT-ANNEALING LINE REWINDS STRIP UNDER 5000 PSI TENSION

D. O. James herringbone-gear coiler drive utilizes large-diameter alloy steel shafts to support 20,000-lb coils rewinding under tension as high as 5000 psi.



What are your coiler, tension reel drive requirements?

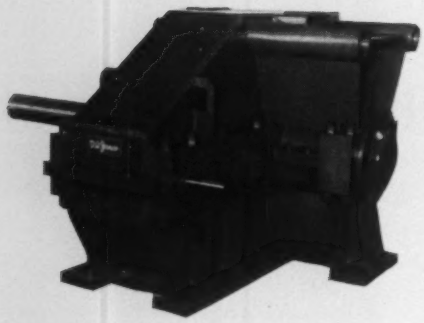
D. O. James specializes in coiler and tension reel speed reducers for all types of continuous strip-processing lines: slitting, grinding, side trimming, pickling, leveling, plating, cleaning.

Rigid, fabricated steel housings accommodate coil pusher rods; support tubes for coil separating, tensioning, or sensing mechanisms; and mounting pads for pusher cylinders or other special equipment.

Wide antifriction bearings mounted in extra-heavy plate maintain coil block concentricity for smooth, even recoiling.

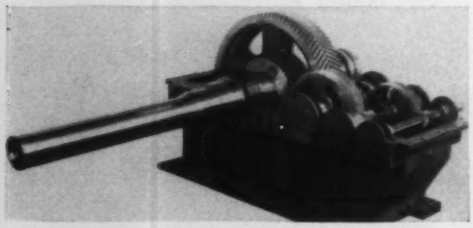
Standard units available with double-reduction ratios from 10:1 to 75:1; triple-reduction ratios from 85:1 to 370:1, in a wide horsepower range. Two-speed ratio combinations optional for wider range of speed variation.

For complete facts, contact your D. O. James representative or write for Catalog 16-60.



Rigid, fabricated steel housings are designed for your own coiler and reel drive requirements.

Extra-wide bearing span in triple-reduction unit supports wide strip or exceptionally heavy coils.



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Defense Production Picks Up

Ford Speeds Work on M-151, Successor to Famed Jeep

The M-151, known as the Mutt, is being rushed overseas. Ford increases production rate on its contract for 7524 vehicles.

Bids on a new contract for the Mutt will also be coming up soon. Ford now only supplier.
By A. E. Fleming

■ To speed overseas shipments, Ford Motor Co. in early November will increase production of the M-151 military truck.

The vehicle, nicknamed the Mutt (Military Utility Tactical Truck) eventually is expected to replace all of the Army's old standard one-quarter ton trucks.

Successor to the World War II Jeep, the Ford unit was developed for Army Ordnance when the Korean War showed design was lagging behind military tactics.

Sizable Order—Ford is working on its second M-151 contract. The first, awarded June 25, 1959, was for 4050 vehicles and certain spare parts. The present one, awarded April 28, 1961, is for 7524 vehicles. The contract expires in February, 1962, under the new speed-up program. A later date had previously been set.

Bids on a new batch of Mutts will start coming in soon since the Army wants to keep production flowing, according to reports. Ford is the only production source at the present time.

More Men—Ford will add 100 workers to a present 190-man staff of workers in order to handle the stepped up program, which will also affect 1157 supplier plants in at least 19 states. Assembly and test facilities are at Ford's transmission and chassis plant in Livonia, Mich.

MUTT GETS GOING: Production of M-151 military truck, the Mutt, is being stepped up at Ford. It's the second contract for the Jeep replacement.

By dollar volume, 85 pct of the work on the Mutt is subcontracted to suppliers who build parts and components for Ford to assemble. There are 327 prime subcontractors, of which 244 are classified by the government as small businesses.

Spreading the Business—The rest are large companies which, in turn, subcontract work to 326 other large businesses and 504 small businesses around the country.

Ford, in fact, is a subcontractor to one of its own subcontractors, Continental Motors Corp. of Muskegon, Mich. Ford's Dearborn specialty foundry shell molds crankshafts used in engines made by Continental for the M-151. Ford's Autolite Div. also supplies sparkplugs to Continental for the engines.

The Facts and Figures—The assembly line is 840 ft long and composed of 21 work stations. Subassembly lines are used to build up engine-transmission-radiator packages, suspensions, and other components. All parts are painted and ready for assembly when they reach Livonia.

The Mutt's open body is of unit body and frame construction. Dimensions are: Length, 132 in.; wheelbase 85 in.; width 62 in. A 4-cylinder inline engine of 141.5 cu. in. displacement develops up to 71 hp.

A key feature of the vehicle is 16 in. diameter cast magnesium wheels, manufactured by Steel Products Engineering Co., a division of Kelsey Hayes Co.

10,000 Steels to Be Tailored

Columbia-Geneva's McCall Takes a Look at the Future

The big problem is to serve needs of the future and still remain competitive in cost.

Coast executive outlines needs of the future and some of the products involved.
By R. R. Kay

■ How can you put a price tag on progress—especially in steel? asks J. D. McCall. He's president of Columbia-Geneva Div. of U. S. Steel Corp.

How can you put the full dollar value on a generation of engineering, research, and development skills—the human factors of creativity—that give birth to new products for sale?

Mr. McCall put these questions to business leaders at the California Industrial Development Conference last week in San Francisco.

Explosive Times—"We're called upon to meet the challenges of these explosive times, to react to dramatic sociological and technical change. At the same time, we have to keep ourselves competitive. We must serve our customers with more and better products, so that they may be competitive, too," he said.

Mr. McCall told about some of U. S. Steel's latest efforts to meet these conditions. It's trying to tailor 10,000 steels to the individual needs of thousands of users.

"To serve the market, we're combining the knowledge of our own product with the knowledge of our customer's product. We try to help him solve his materials problem at the lowest possible cost," he said.

Things to come in steel as he sees it:

Containerization — Containerization will revolutionize the transportation industry. A lightweight steel container, perhaps like a modified trailer, will go bodily from the hold of a ship. Then it can attach to the cab of a truck, float as a barge, or go piggyback by rail. At destination, it can serve as a warehouse.

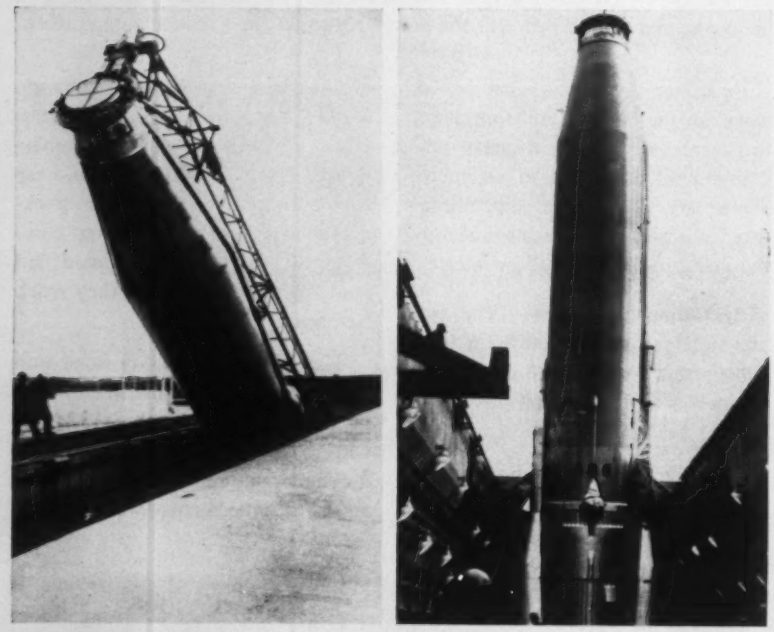
His company's newly created 9 pct nickel alloy steel may open new markets around the world for subzero liquefied gases. He believes that huge storage tanks will carry, by truck and ship, enormous quantities of natural gas liquefied in a volume reduction ratio of 630 to 1. Many other uses for the alloy are in the dream stage.

New steels for automobiles will go farther and do more work. An example is unitized body design.

Bushel Basket Out—The bushel basket is out as a container to market fruits and vegetables. Mechanical tree shakers will probably harvest fruit into stainless steel vats. Water in the vats would keep the fruit from bruising.

What about new steel for construction? Mr. McCall talked about the steels with yield strength of 33,000 to 300,000 psi. Combinations of these are already in use in multiple steel design concepts. They're going into buildings, bridges, oil rigs, missile cribs, trucks, and railroad cars.

Atlas Squadron Stands Ready to Soar



NOT LOADED: Minus its warhead, an Air Force Atlas ICBM is raised from its cell and placed in its launching position. It was the final check before the squadron was turned over to the Strategic Air Command.

Is Business on the Upswing?

Latest NMTBA Figures Indicate Definite Rise

Optimism mounts with new orders during best quarter in more than four years.

But sales of metal forming equipment continue to lag.
By R. H. Eshelman

■ Has the long-awaited autumn rise finally hit machine tool business? Perhaps less spectacular than many predicted, the steady swell of orders can now be definitely confirmed as on the upswing. Figures from the National Machine Tool Builders' Assn. for September are proof.

New orders for the month, the association reports, are the highest since March. In fact, the total net new orders for metal cutting type machine tools for September totaled $56,750,000—the highest monthly figure since March of 1957. That's 23.5 pct above the monthly average for 1961.

This surge brings the third quarter total to more than $148 million. Thus, it's the best quarter since the first in 1957.

Presses Lagging—The data for metal forming equipment (presses) in September are not so spectacular. A net of $10,550,000 is above the month of August. However, total net new orders for the first nine months came to $95,700,000, or some 11 pct below the like period of 1960. Still, it seems likely that the total figures for the year will finish ahead of last.

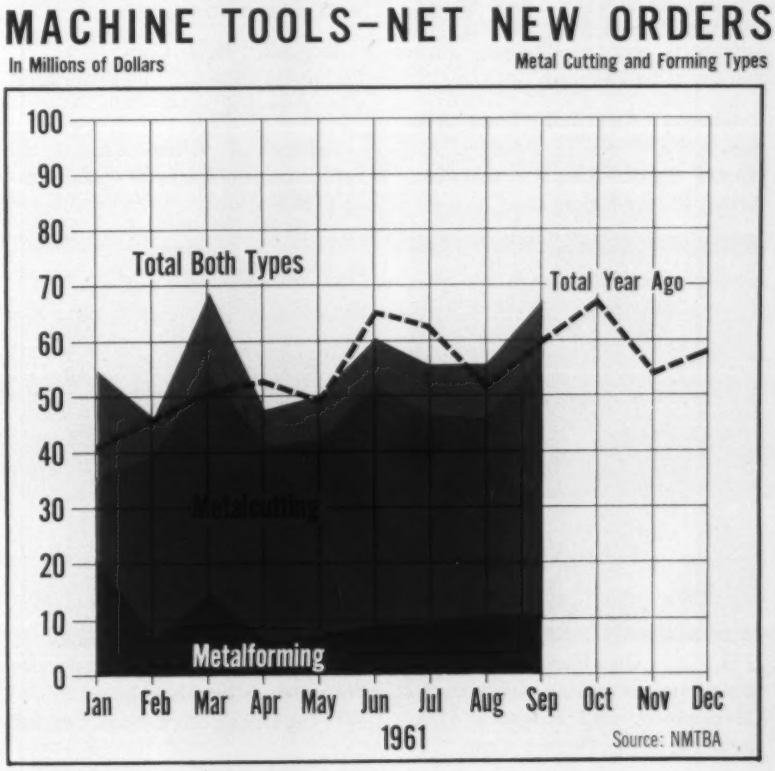
Prolonged labor negotiations in the auto industry are blamed by many for failure to develop a large bulge in orders. Orders for special machinery and heavy presses apparently have not turned upward along with other lines.

But many builders are finding October's reports to be better than those of September. Many New England companies are finding the gentle business rise is developing into a substantial advance. Consensus in that area is that the fourth quarter will prove the best of the year, with a continued steady, but not spectacular rise.

Business Brisk—A number of New England firms are humming along at capacity operations, with several months' backlog. Spokesmen for Bullard Co., for instance, say that if the present level of activity continues through December, they will be in the black for the year, after several disappointing seasons.

$100 Million—More good news comes from the Department of Defense. For the fiscal year 1962 approximately $100 million will go into machine tools and production equipment, the NMTBA has learned. And the entire allocation will go for these items, instead of being siphoned off for other programs as has happened in the past. This figure compares with about $40 million allotted for fiscal '61.

The Air Force has the largest purse, approximately $60 million, the Army about $25 million and the Navy $12 million, it's reported. Also about 60 pct of the expenditures are for replacement of present equipment, with 40 pct going for new production lines.



MEN IN METALWORKING

D. A. Fitch, appointed sales manager, pipe lines, National Tube Div., U. S. Steel Corp.

Chain Belt Co.—R. H. Hoefs, appointed chief metallurgist, research center.

E. W. Bliss Co.—N. L. Desmond, named factory manager, Hastings Div.; J. L. Chase, named sales manager, container machinery.

Firth Sterling Inc.—H. A. Zell, appointed general manager, Firth Sterling (Canada) Ltd.

General American Transportation Corp. — R. H. Morley, appointed general manager, manufacturing, Parker-Kalon Div.

Sylvania Electric Products Inc.—J. O. Lawson, appointed manager, quality control, Parts Div.; S. A. Willits and J. E. Hill, appointed field sales representatives, Parts Div. (A subsidiary of General Electric Products Inc.)

Hughes Aircraft Co.—R. D. Weglein, appointed head of product development, Microwave Tube Div.

Kawecki Chemical Co.—M. S. Roesler, named vice president and treasurer.

Nichols Wire & Aluminum Co.—J. M. Morris, named executive vice president; J. D. Case, named vice president, sales; J. H. Bashford, elected vice president and treasurer.

National Automatic Tool Co., Inc.—W. K. Ginman, appointed sales manager, Induction Heating Equipment Div.

Peter A. Frasse & Co., Inc.—R. H. McDonald, appointed asst. New York district manager.

Republic Steel Corp. — R. T. Richmond, named chief engineer, Youngstown district.

Babcock & Wilcox Co.—T. E. Jasin, appointed general traffic manager, Boiler Div.

B. W. Weber, appointed group vice president, Manufacturing, Employee Relations and Administration Divisions, Metal & Thermit Corp.

American Measurement & Control Inc.—Dr. F. D. Ezekiel, named general manager.

Blaw-Knox Co.—D. C. Cannon, named director, marketing, Blaw-Knox Equipment Div.

Avco Corp.—H. L. Flowers, named general manager, engineering, electronics operation, Electronics & Ordnance Div.

Schacht Steel Construction, Inc.—J. T. Fisher, named vice president.

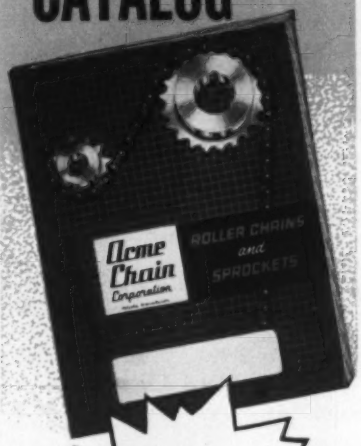
Universal Marion Corp.—B. W. Crenshaw, appointed executive vice president and general manager, Scullin Steel Div.

H. E. Hirschland, appointed group vice president, Commercial Development and Research Divisions, Metal & Thermit Corp.

J. L. Oberg, appointed group vice president, Minerals, Ceramics and Welding Divisions, Metal & Thermit Corp.

D. W. Oakley, appointed group vice president, Chemicals, Coatings and Plating Divisions, Metal & Thermit Corp.

ACME'S *NEW* ILLUSTRATED CATALOG



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A. W. Knutson, appointed vice president, sales, American Steel Warehouse Co. and its subsidiaries.

Emhart Manufacturing Co.—G. F. Crosby, Jr., appointed manufacturing manager, Hudson, N. Y., Div.

Fairchild Stratos Corp.—L. E. Kirk, Jr., appointed asst. to the president.

General Bearing Co., Inc.—W. E. Horenburger, appointed national sales manager.

Hupp Corp.—K. M. Spurgeon, appointed general sales manager, Hupp Aviation Div.

Hevi-Duty Electric Co.—R. L. Hosfield, named product manager, Oven Div.

Howe Sound Co.—R. W. Martini, appointed asst. chief metallurgist and J. A. Finnegan, appointed

Col. Sam Efnor, Jr., appointed vice president, operations, United Technical Industries.

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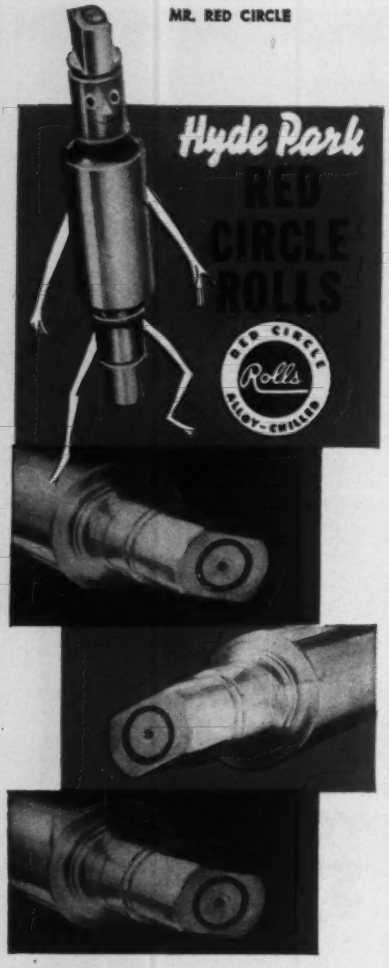

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technical representative, Misco Precision Casting Co. Div.

Chase Foundry & Manufacturing Co.—P. E. Smith, appointed vice president, sales.

Union Carbide Corp.—C. H. Atwood and F. P. Wilson, appointed vice presidents, Union Carbide International Co. Div.

Metal Products Corp.—W. K. Lancet, appointed vice president, sales; C. T. Reynolds, appointed vice president, operations; R. A. Lancet, appointed vice president, administration; R. P. McCalip, appointed controller .

Electric Autolite Co.—E. R. Koppel, appointed asst. to the president.

Black & Decker Manufacturing Co.—F. A. Alden, appointed purchasing manager; A. N. Dahl, named manager, special sales, marketing div.

Cooper-Bessemer Corp. — E. J. Fithian, Jr., named manager, Locomotive Engines; J. S. Tonetti, named asst. manager, gas turbine sales.

Foxboro Co.—E. W. Pitt, named Western field sales manager.

Scherr-Tumico, Inc. — W. M. James, named vice president, sales.

Hobart Brothers Co. — W. G. Brooks, appointed staff sales engineer, Automatic Welding Div.

M. H. Luria, appointed asst. regional vice president, Luria Bros. & Co. Inc.

Kaiser Steel Corp.—R. L. Boorman, appointed director, corporate planning and control; A. L. Collin, appointed asst. manager, engineering sales.

United States Steel Corp.—W. O. Lawrence, appointed vice president, manufacturing, Universal Atlas Cement Div.; J. G. Munson, Jr., appointed asst. to administrative vice president, production; J. F. Collins, appointed asst. director, personnel services.

Alloys Unlimited, Inc. — W. J. McCormick, named controller.

American Machine & Foundry Co.—R. P. Conniff, named manager, Washington regional office, Government Products Group.

Witt Cornice Co.—C. S. Racel, appointed manager, Anchor Galvanizing Co.

American Metal Climax, Inc.—Frank Wills, appointed technical manager, Pyron Co.

Budd Co.—G. E. Sykora, appointed manager, standards and quality control, Instruments Div.

Omnitronics, Inc.—A. G. Fitzpatrick, named sales manager. (A subsidiary of Borg-Warner Corp.)

Motorola Inc.—R. W. Elsner, appointed engineering manager, Western Center, Military Electronics Div.; R. L. Borchardt, appointed national service manager, Communications & Electronics Div.

A. B. Fisher, Jr., appointed chief engineer, Engineering & Construction Div., Koppers Co., Inc.

W. B. Browning, Jr., named chief engineer, Armco Div., Armco Steel Corp.

Radio Corp. of America—L. M. Falk, appointed manager, support engineering, Data Communications and Custom Projects Dept., Electronic Data Processing Div.

Pittsburgh Plate Glass Co. — J. W. German, appointed market manager, commercial construction; F. C. Paffard, Jr., appointed market manager, automotive replacement glass; R. D. Spencer, appointed market manager, residential construction; Joseph Stern, appointed market manager, industrial and specialty glass. All of the marketing planning dept., Merchandising Div.

Armco Steel Corp.—W. R. Wiedman, appointed standard pipe representative, Denver, Colo., National Supply Div.; B. A. Jackson, appointed plant representative, Houston plant, National Supply Div.

Allis - Chalmers Manufacturing Co.—R. E. Goodwill, appointed sales manager, Norwood (Ohio) Works electrical dept.; J. F. Fenske, named manager, motor sales, Pacific Region.

OBITUARIES

J. W. Higgins, 87, board chairman and a founder, Worcester Pressed Steel Co.

W. M. Fairbairn, chairman of the board, Barnes Drill Co.

C. M. Mason, 71, former sales manager, Jones & Laughlin Steel Corp.

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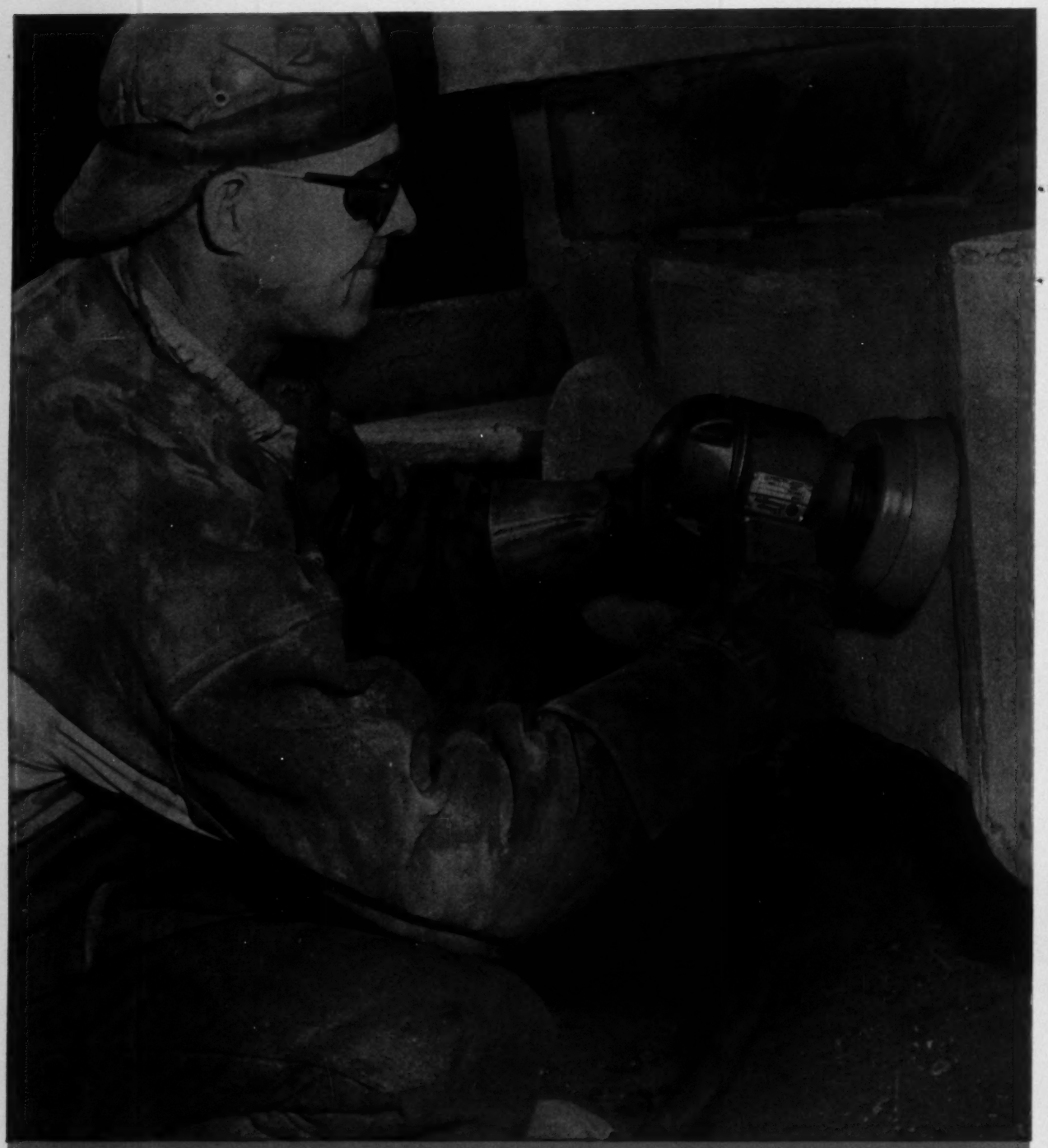
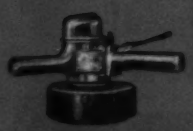
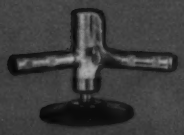


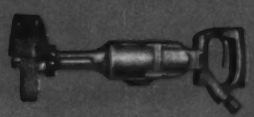


6" Vertical Grinder.

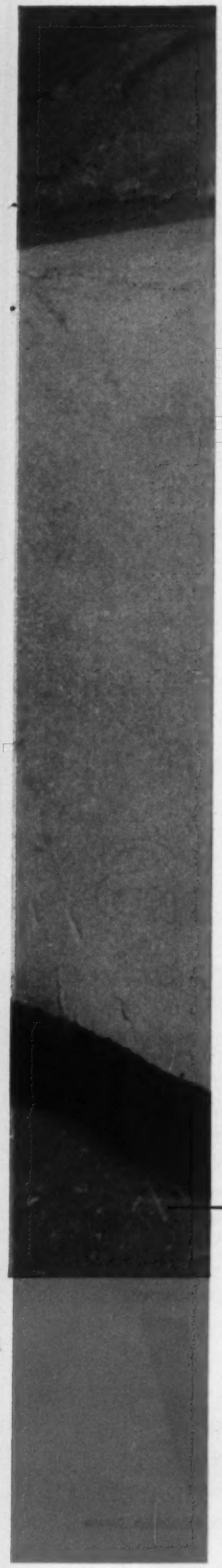


7" Vertical Sander.

6" Straight Grinder.



8" Straight Grinder.



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CP Grinders deserve their industry-wide reputation of cutting metal removal costs on every job. The compact, lightweight housings provide the handling ease for every metal finishing operation.

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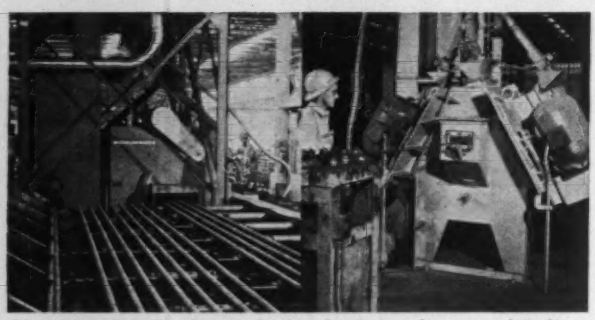

Machine at left simultaneously descales four rods up to 4½" diam. Machine at right illustrates typical single-strand wire descaling cabinet.

A demonstration of WHEELABRATOR'S

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In the mechanical descaling of rod and bar stock, Wheelabrator offers you the vital experience of scores of successful, profitable installations. Leading producers of wire and wire products are now enjoying the competitive advantage inherent in automated manufacturing methods and freedom from the problems associated with acid pickling, made possible by Wheelabrator abrasive blast descaling.

Rod can be straightened, cleaned, coated, drawn and cold-headed in one continuous, straight-line operation, in single or multiple strands, at speeds up to 600 fpm. Multiple handling of coils and bar stock through batch processing is eliminated. And, the minutely cupped surface produced by the Wheelabrator method provides better drawing characteristics, and improved adhesion of coatings.

To reduce your descaling costs, eliminate the pickle house and combine cleaning with manufacturing processes, investigate Wheelabrator airless blast descaling. Write for complete information.

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Retards Interest to Invent

A House Space Subcommittee on patents may recommend that NASA start taking fewer titles to space inventions by industry. Representative Emilio Q. Daddario, D., Conn., the subcommittee chairman, says: "Allowing the government to keep title to space-research inventions will stifle the U. S. space program." He says it retards the interest of American enterprise to invent.

Ether Powers Hydraulics

Flight of the X-15 rocket plane, at speeds of over 3000 mph is ample proof that the U. S. can operate hydraulic systems at 1000°F. In the present state of the art, it's agreed that polyphenyl ethers are the top available materials for the system. The advance beyond 1000°F calls for the use of special glasses.

On Moon First, Earth Later

Exotic power plants may be in use on the moon even before one is in full-time operation on the earth. So says Dr. J. A. Hutcheson, vice president of engineering, Westinghouse Electric Corp. In a talk at Honolulu, he credited this unbalance to the present pace of research. The electrical industry alone spent nearly one-fifth of all R&D dollars ($13 billion) in the U. S. in 1960.

Ceramic-Bonded Lubricant

The Air Force has developed a ceramic-bonded solid-film lubricant which appears to meet high temperatures and loads with low friction wear. The film is composed of lead sulphide as the lubricating pigment in combination with boric oxide as the ceramic binder. This film exhibits both low friction and wear under loads to 60,000 psi and sliding speeds over 200 fpm.

Bottom's Falling Out

According to Dr. James Van Allen of Iowa State University, the biggest need for continued space progress is a massive boost for basic science. This would probably have to come from the Federal Government to colleges and universities. "Today, our technology has outrun our basic research foundation," the world-famous scientist declares. This is the real reason for so many space-shot failures. Unless this scientific gap is shored up, he foresees a gradual tapering off in our technological progress.

Program For Outer Space

The U. S. State Dept. has prepared a program to extend international law to outer space. The program, supported by President Kennedy, will be presented to the U. N. It would: 1. Extend U. S. authority to outer space. 2. keep individual nations from claiming parts of space or celestial bodies. 3. Set up a system of registering all objects launched in outer space. 4. Set up a world weather watch using satellites. 5. Set up a system of communications satellites to link the world by telegraph, telephone, radio and television.

Keeps Missiles on Course

A significant advance in space-vehicle control was marked by the development of a pulse-modulated bipropellent control rocket at Vickers Inc., Div., of Sperry Rand Corp. The control rocket's

CONTROL ROCKET: At work in the lab.

solenoid, fuel valves and thrust chamber are housed in one compact unit. The system, responding to a command in milliseconds, will keep future space vehicles and missiles in line.

'Talon' Loses Weight

Many airframe components are contoured, tapered or stepped to satisfy airflow and weight-reduction needs. Norair Div., Northrop Corp., reports chemical milling puts the final touch on most of the forgings used on the Airforce's T-38 Talon. One example is the dorsal fin covers. These parts, forged from 0.25-in. magnesium sheet, retain heavy webbing only where needed. Other areas are chem-milled to 0.08 in.

MIDVAC INCREASES STRESS RUPTURE LIFE 6 TIMES FOR JET TURBINE PARTS

MIDVAC STEELS ARE PRODUCED BY THE MIDVAC PROCESS OF CONSUMABLE ELECTRODE MELTING

When maximum reliability in the high temperature range and minimum rejects are required that's the place to specify Midvac Steels. These steels assure super alloys of increased tensile, higher impact properties, improved stress rupture strength at elevated temperatures and longer fatigue life.

As an example air melted No. 901 had excellent high temperature strength, but often failed slightly below the required stress rupture hours (15) with little to spare over the minimum ductility requirements. Well over 100 hours can be attained with Midvac melted No. 901.

The Midvac Process of consumable electrode melting eliminates atmospheric contamination, ingot soundness is improved, segregation is reduced, workability is increased and product quality is stepped-up. Midvac Steels are offered in many alloys as billets or forgings to meet the most critical design specifications of jet engine parts, missile and aircraft components and other products requiring properties beyond the capabilities of conventional steels. Let M-H metallurgists help you select the right alloy to meet your product's specifications. Write . . .

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TOP-LEVEL CONFERENCE: F. L. Maytag II, right, discusses results of factory-engineering test program with I. A. Rose, vice president of manufacturing and C. Gecan, manager of quality control and inspection.

Direct Approach Is the Secret In Making Quality Pay Off

If you've got a quality control problem—and who hasn't—why beat around the bush?

Why not solve the problem at its source? By getting down to grass roots, you gain production and consumer bonuses.

By **R. H. Eshelman**
Machinery Editor

■ Everyone wants to make quality and reliability pay off. In consumer fields, this mushrooming trend often finds an outlet in campaigns to improve a product's public image.

The easy way around a reliability problem is to use the lots-of-noise approach. You've got to counter the old adage: They don't build them like they used to.

Better Solution — Of course, there's another way to solve the problem. One company with a reputation for making dependable products believes in using the direct approach.

The Maytag Co., Newton, Iowa, is nationally known for its durable washing machines. Since 1907, this company has enjoyed an enviable reputation by building quality into every product.

F. L. Maytag II, chairman of the board and chief executive officer, says home appliances get more complex every year. But he doesn't see a need for magic formulas nor artificial image making.

Aim High—Instead, Mr. Maytag puts it this way: "Without detracting in any way from the people involved in the technical aspects of a quality control program, the most vital ingredient is a high-level conviction that your organization won't accept anything less than the best. This conviction must remain paramount from basic design concepts to end products."

In other words, the people who design a product have to believe that nothing will do except the very best. Then, manufacturing and supporting groups must carry the ball all the way down the line.

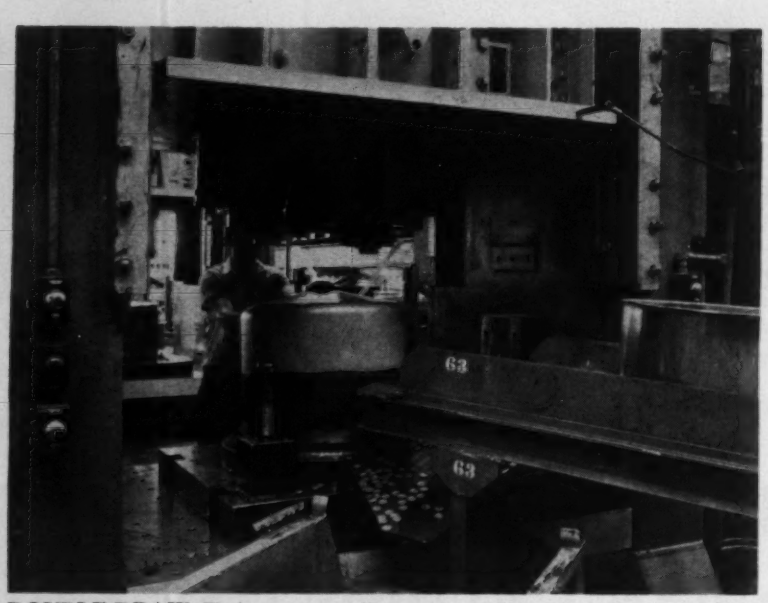
An important corollary, Mr. Maytag points out, is the need to avoid artificial obsolescence. What does this term mean? Perhaps the best explanation centers on a styling change that appears to be new—but isn't.

"We don't change models every time the calendar rolls around,"

says Mr. Maytag. "We think it's far more important to produce a perfect product. When we make a change, we want to be sure it's an improvement."

Stay Alert — The reputation which this company has earned stems from the long-term efforts poured into its quality products. In the early days of small-lot production, there were lots of debugging problems that had to be solved. Today, there's still no relaxing.

Maytag's design people spend almost as much time trying to perfect production runs, as they do in finding ways to alter a proven design. With this approach, nobody gets off the hook by saying: "Oh well, by the time we can get that fixed we'll be out of production."



DOUBLE DRAW: To improve quality, washer tubs undergo a reverse draw.

BRIGHT LIGHTS: Special lighting, along production lines, aids inspectors in checking the porcelain-enamel coatings on washer baskets.

The company's sound thinking is reflected in its factory-engineering lab. This lab is devoted to intensive product and components testing. Using ingenious life-cycle test setups, the lab represents a practical rather than a book evaluation.

At random, the factory-engineering group selects packaged units or completed components from the production lines. They're given accelerated-use tests which simulate 20 years of consumer operation. The same tests are applied to pilot models before they're released for production.

Up to Snuff? — Components which are tested may contain engineering changes. Sometimes they're chosen as the result of service complaints. In every case, the testing crew wants to know: How do the washers perform from the user's point of view?

The test program pinpoints where improvements can be made. It also proves out new designs. A case in point is the recent innovation of an electronic drier control. This control senses the moisture level in a drier and switches the appliance off at the optimum time.

Surprisingly, the lab is still testing and searching for ways to improve wringers. The company still turns out a heavy volume of wringer-type washers. One wringer test uses endless leather belts to create severe stresses.

On-Line Efforts — Now, let's check quality's role on the production lines. On these lines it's apparent that quality involves the entire organization. Tubs, for instance, get two draws. After a deep-forming draw, every tub enters a second press. Here, it undergoes a reverse draw which further improves quality.

Mr. I. A. Rose, vice president of manufacturing, reports: "Through efforts at job enlargement, from press operators to production supervisors, Maytag continues to instill responsibility and interest."

He adds, "Meeting schedules, obtaining optimum quality, holding

down costs and plant safety aren't inconsistent. In fact, they go together. Maximum employee job satisfaction rounds out our well-planned program."

Room for Improvement—Manufacturing management at this company often works in an informal manner. However, it's seldom content with the current ways of doing things.

Mr. Rose's people continually study all production phases. They're always looking for a better way to make things, while increasing a worker's feeling of pride in his product.

Quality controls and inspection are part of the manufacturing job. Special lighting stations along the assembly lines and in the finishing areas allow meticulous checks. Flawed parts don't get by; but there are few total rejects. Minor reworking brings most of the defective parts up to snuff.

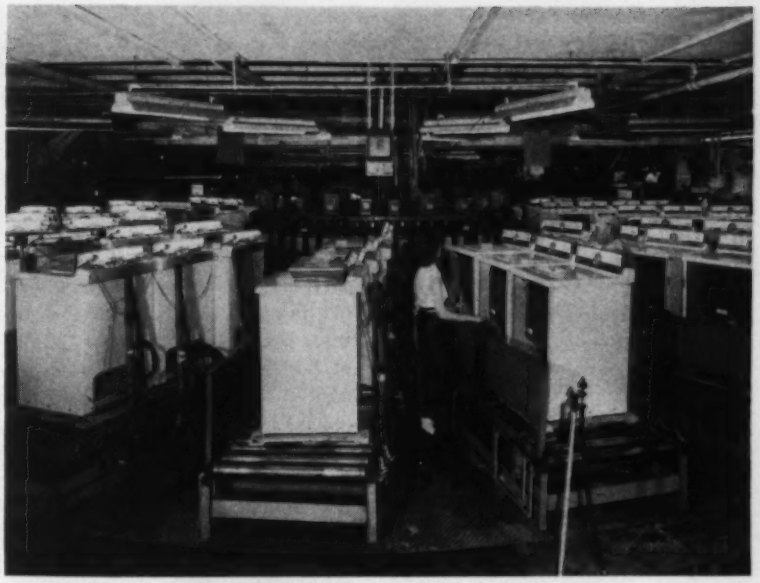
At final inspection, a round-table arrangement completes run-in tests on all automatic washers. When these finished units come off the line, they transfer to this revolving platform.

Check All Stages — Operators quickly hook up water, electrical and plumbing connections. As each washing machine completes its test trip, it cycles through every stage of regular operation. A similar test loop is used for the dryers.

Test instruments record every machine's performance. The results are noted on a card that travels with the appliance. Washers with substandard performance are bounced off the test platform and sent back for reworking. Accepted units move along to final checkout and packaging.

If any service problem develops, the dealer can check his half of the record card to see how the machine stood up under performance tests. Should a serious difficulty arise, Maytag can also pull its half of the record card out of the files.

With its own service organization and a field group of service supervisors, the company gets prompt and accurate trouble reports. Manufacturing management and the quality control team go over these weekly reports. This helps to eliminate production-trouble sources before they become epidemics.



REVOLVING TEST PLATFORM: Swinging fixture moves automatic washers off the assembly line. It takes about 30 minutes to complete each test. Every washer is put through its paces on this revolving platform.

RECORDS DATA: Inspector reads test results from automatic recorder.

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Planned Annual Retooling Gives Chip Hammers Edge on Costs

When chipping hammers lose their bite, which is cheaper, repair or replacement?

A planned annual retooling program keeps efficient tools on the job, lowers maintenance costs.

■ The roughest hurdle that most modernization programs must clear is to pay for themselves within a specific period of time.

Elyria Foundry Div., Chromally Corp., Elyria, O., with the aid of Ingersoll-Rand Co., New York, devised a chip-hammer replacement program that does much more. It's called planned annual retooling (PAR).

The program pays for itself every three months through increased production. Spare part inventories are cut in half and maintenance costs are reported to be down.

High Workload—The company has 33 chippers at work in its clean-up building. The operation serves three foundries which average 1400 ton of castings monthly. The productive capacities of the air tools depend on both the operators' efficiency and the tools' efficiency.

As the tool goes, so goes the operator. A tool operating at 50-60 pct efficiency wastes the equivalent of two or three hours per shift. Just how rapidly air tool efficiency drops off depends on various factors. These include: Tool type, tool use, environment, operator skill and maintenance.

Tooling Plan—After reviewing the foundry's chipping system, Ingersoll-Rand recommended a planned annual retooling program of twelve tools per year—purchased at a rate of one per month.

The system keeps each chip hammer in operation for a little less than three years. For the first six months of the program, the rate was doubled to replace the very old tools in the system.

After a lengthy test period, the foundry reports a 10-pct increase in production as a result of the PAR program. The 10-pct increase represents an annual return of $8,791.20, based on an annual payroll of $87,912 for actual tool-use time.

The return is achieved with an annual investment of only $2160 which is equal to 12 tools at an average cost of $180. Thus, the program pays for itself four times a year.

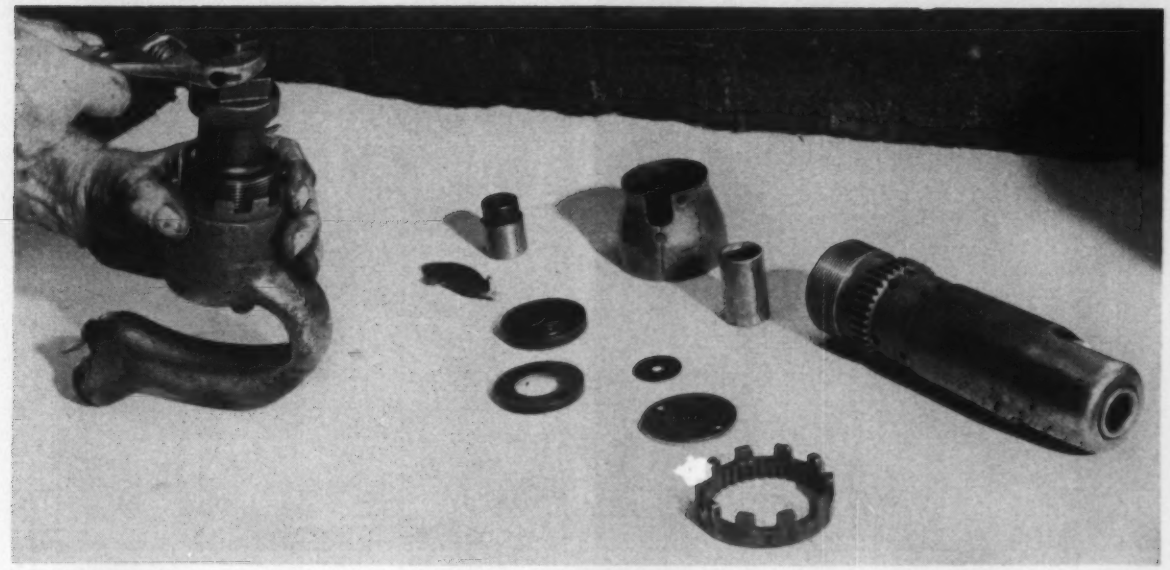
Added Dividends—The company also uses the program to help solve one of the most frequently overlooked factors in employee relations. Employees want to know where they stand. Does their immediate supervisor think they are doing a good job?

Employee surveys show this to be highly important. However, in the constant rush of production activities, supervisors often find it difficult to give sufficient time to such activity.

As new tools are purchased in the PAR program, the least efficient tool is retired from the system. However, the new tool is not necessarily assigned to the man with the tool to be replaced.

A bumping system is used. The new tool is given to the man considered to be most efficient. His tool, in turn, is given a minor check-up by Maintenance and assigned to

SHARPER TOOLS: The planned annual retooling program keeps fresh chippers on the job without building up a large inventory. New tools get the job done faster, with less exertion required on the operator's part.



DOLLAR GAINS: Hammers are given a repair every six months and a major overhaul every year. Maintenance costs drop with a planned replacement system, since overhaul costs increase with the age of the tool.

the second best, and so on down the line. There is little doubt as to how each operator stands.

The system provides a built-in incentive to improve the operators' standing, and to make the job easier. The newer, more powerful tools do a better job of chipping with less operator exertion.

Keeps Tools Clean—Chip hammers are oiled twice a day, morning and noon. This adds to efficiency. In addition, air line lubricators are kept filled. The use of adequate size hose, with no splices between lubricator and tool, assures that the oil reaches the tool.

Operators are instructed to blow the moisture out of the air line before attaching the tool. When the tool is disconnected, it should be set connecting side down to keep dirt and grit out.

Less Inventory—Cost of maintenance and spare parts are also reduced by the PAR program. Previously, when a tool was overhauled 10 or 12 times, a much greater inventory of spare parts had to be kept on hand.

Chipping hammer pistons are a typical example. These pistons were stocked in 0.002-in. increments up to 0.020-in. oversize. With the replacement system in effect, pistons are now stocked to only 0.008-in. oversize. The overall program reduces spare parts by 50 pct.

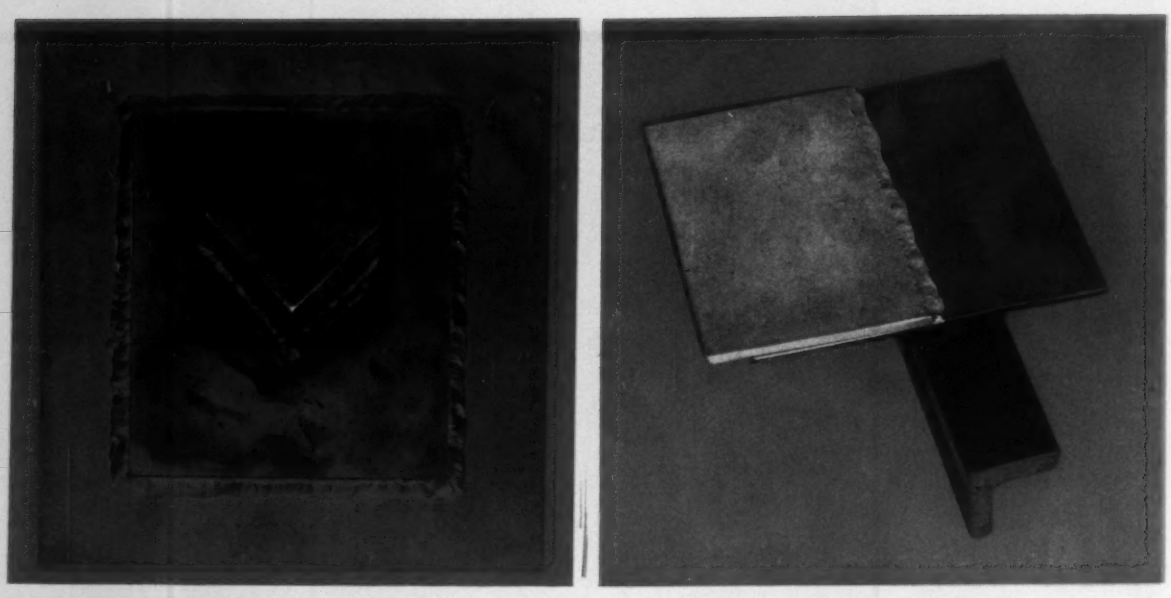
Hammers are given a repair every six months and a major overhaul every year. The number of major overhauls are reduced by one-third, since the tool is replaced before the last major overhaul. Maintenance costs, on the other hand, are reduced more than one-third because major overhaul costs increase with the age of the tool.

Carries Load—One factor was encountered that had not been anticipated at the start of the air tool replacement program. A much higher percentage of high-strength nodular iron is being cast.

The original estimate was based on chipping gray iron. However, a 10-pct increase in production has been achieved in spite of the more difficult chipping condition.

How Investment Pays Off

a. Average annual payroll	**$146,520**
b. Tool use factor	**60 pct**
c. Annual payroll for actual tool use time (a x b)	**$87,912**
d. Estimated increased production	**10 pct**
e. Total dollar savings from PAR (c x d)	**$8,791.20**
f. Annual tool replacement budget (12 x $180 average tool cost)	**$2,160**
g. Estimated savings (e –f)	**$6,631.20**
h. Payback period $\frac{\text{(f x 12 months)}}{\text{e}}$	**2.95 months**



IRON TO ALUMINUM: Coated-electrode process yields sound joints between angle-iron legs and bimetal sheets. Tungsten-arc lap welds secure aluminum panels to the opposite side of each clad-metal transition sheet.

Bimetal Plate Raises Strength Of Aluminum-to-Steel Joints

By **C. Wilmarth** and **W. Dudovicz,** Metals & Controls Inc., Div. of Texas Instruments Inc., Attleboro, Mass.

Using a special transition plate, you can weld aluminum to steel or to cast iron.

Tensile test specimens prove that the welds hold up. All failures occur in the base metal.

■ Do you want to weld aluminum to steel? Why not do it the easy way? All you need are clad-metal filler sheets. With preshaped sheets or plates, you can employ your normal welding procedures for both metals.

Every sheet contains a special transition material. It's made by a patented cold-bonding process. The bond between the aluminum and the steel on every clad-metal sheet is metallurgical, not mechanical.

Application in the shop is quite simple. First, you weld steel or cast iron to the steel side of the transition sheet. Then you weld aluminum to the transition sheet's other surface. Thus, metallurgical joints secure the metals.

Strength Factors—Common-use methods of joining aluminum to steel center on a brazing or soldering approach. However, these joining techniques yield low-strength joints.

Good strength is an inherent factor with the new metal-joining method. This method is the result of extensive research conducted by Metals & Controls Inc., a corporate division of Texas Instruments Inc.

Let's run through the welding of steel to the transition material's steel surface. The widely - used coated-electrode process proves satisfactory. It's desirable to use an easy-start coated electrode. This prevents the bimetal's aluminum portion from reaching its melting point.

Slower welding processes must be avoided in making the steel-to-steel joints. Never resort to tungsten-arc or oxy-acetylene welds. Both of these welding methods create aluminum-melting problems.

Fusion Methods — Now, we'll move over to the aluminum side of the clad metal. How should it be welded? Again, you can probably use your present welding procedures.

Any conventional fusion-welding process can be employed to join the

aluminum to the bimetal filler's proper surface. You can use coated-electrode, oxy-acetylene, tungsten-arc and metallic inert-gas methods in welding the aluminum.

The steel portion of the bimetal has a melting point of 2600°F. The aluminum melts at 1200°F.

Take Your Pick—Various conventional-joint designs can be obtained. A few examples appear with this text. The first illustration shows a 3/16-in. thick angle iron with 1½-in. long legs. It's fillet welded to the steel side of the clad metal.

A ⅛-in. thick aluminum sheet is lap welded to the edge of the aluminum portion of the clad metal. No special welding techniques were used to obtain this lap weld.

The coated-electrode process was used to weld the angle iron to the steel. Aluminum lap welds, on the other hand, were obtained by employing the tungsten-arc process with a filler-wire addition.

Another Angle—The second illustration shows an angle iron joined to a ⅛-in. thick aluminum plate. Again, the transition material allows the fillet welds to secure the ¼ x 1 x 1-in. angle iron to the steel side of the bimetal. The aluminum sheet is lap welded as previously described.

In the third illustration, there are two variations of the angle-iron side of a bimetal joint. The sample on the left shows the joint that results from making a single-fillet iron-to-steel weld.

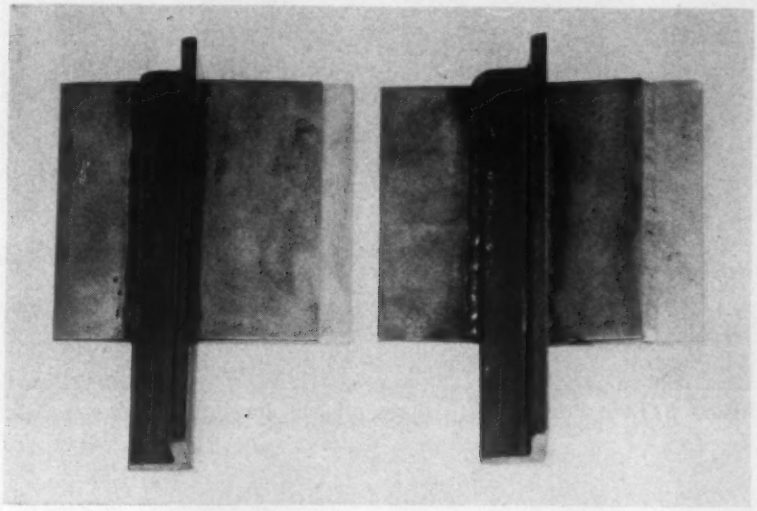
If additional strength is a must, a lap iron-to-steel weld and a lap aluminum-to-aluminum clad-metal weld can be effected. The sample on the right in the third illustration shows these high-strength composite joints.

Test Data—Next, let's study the shear-tensile specimens that appear in the last illustration. All of these test samples were made by using ⅛-in. thick x ¾-in. wide 1010 steel. Employing a coated electrode, the steel was lap welded to a 0.1-in. thick x ¾-in. wide bimetal plate. The bimetal plate contains 50-pct aluminum and 50-pct steel.

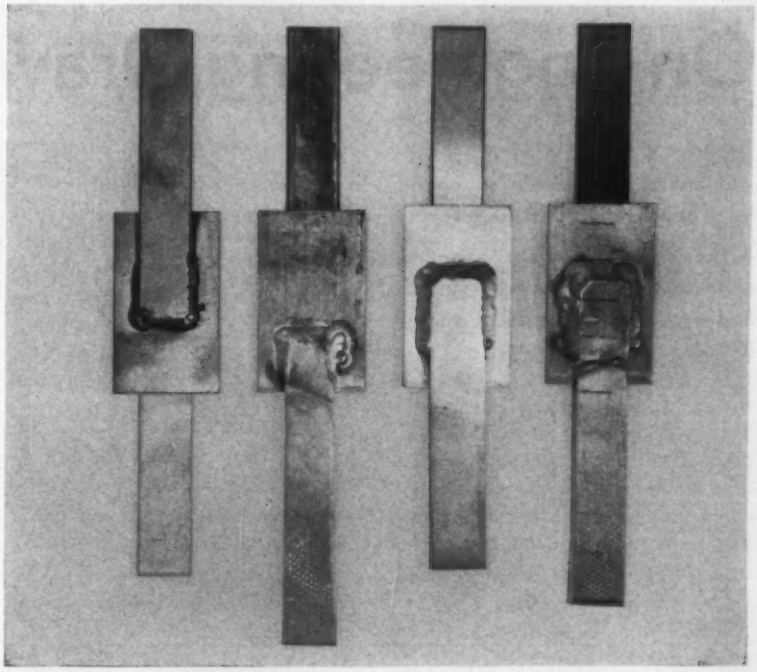
Two types of aluminum were tested. Both of the samples on the left in the last illustration show Type 1100 aluminum joined to the bimetal with tungsten-arc lap welds. On both of these test joints the aluminum measures 0.1-in. thick x ¾-in. wide.

Type 5052 aluminum was used to make the other two test samples, ¾ in. wide and 0.2 in. thick.

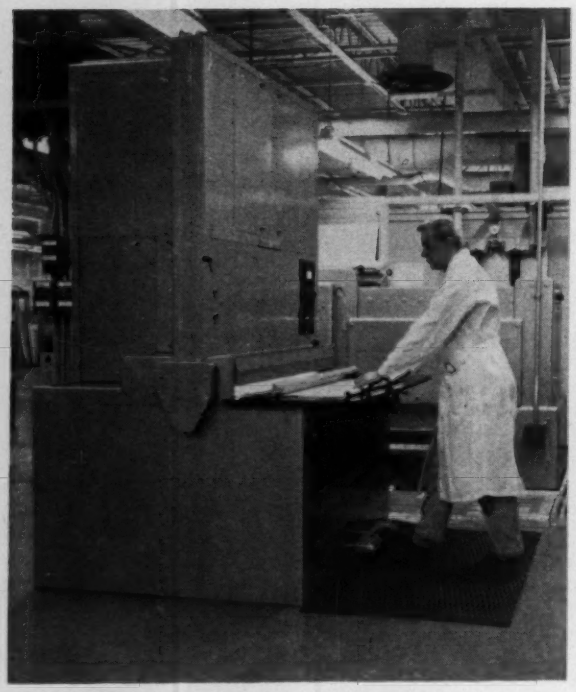
Four shear tests were made on each of the aluminum-to-steel test shapes. With the 0.1-in. thick aluminum, average shear strength is 11,100 psi. Average shear-tensile strength of the 0.2-in. thick 5052 aluminum is 24,600 psi.

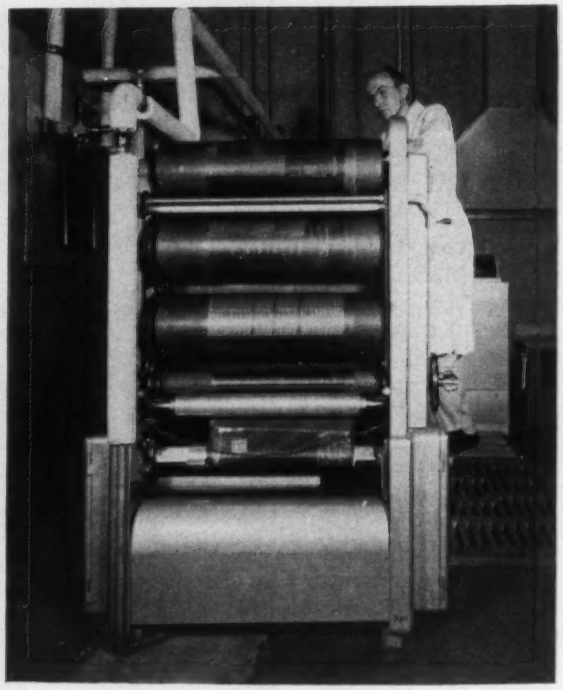


TAKE YOUR CHOICE: Single-fillet weld serves sample to the right. A stronger iron-to-steel lap weld (left) can also be easily effected.



SHEAR-TENSILE TESTS: Laboratory results prove the bonds are stronger than the aluminum alloy. Two types of aluminum were checked out.





FIRST STEPS: Printer (left) reduces original drawings to half-size. Machine at right processess transparencies.

Half-Size Prints Offer Savings On Engineering Drawings

It takes a mountain of paper to produce a jet airliner.

The whole problem of blueprint distribution can be simplified by cutting the size of copies in half.

■ Not too long ago, officials of the Transport Division of Boeing Airplane Co., Renton, Wash., estimated that the engineering blueprints needed to produce the average 707 Jetliner weighed over 50,000 lb. The payload of the actual airplane itself is about 57,000 lb.

This mountain of paper included about 22,000 original drawings. Forty copies of each print are required, so the grand total of print copies reaches 880,000.

Small wonder then that the company converted to half-size prints. The Transport Division's new retrievable miniaturization program has achieved worthwhile savings in time, labor and materials. Also, less space is needed as filing space.

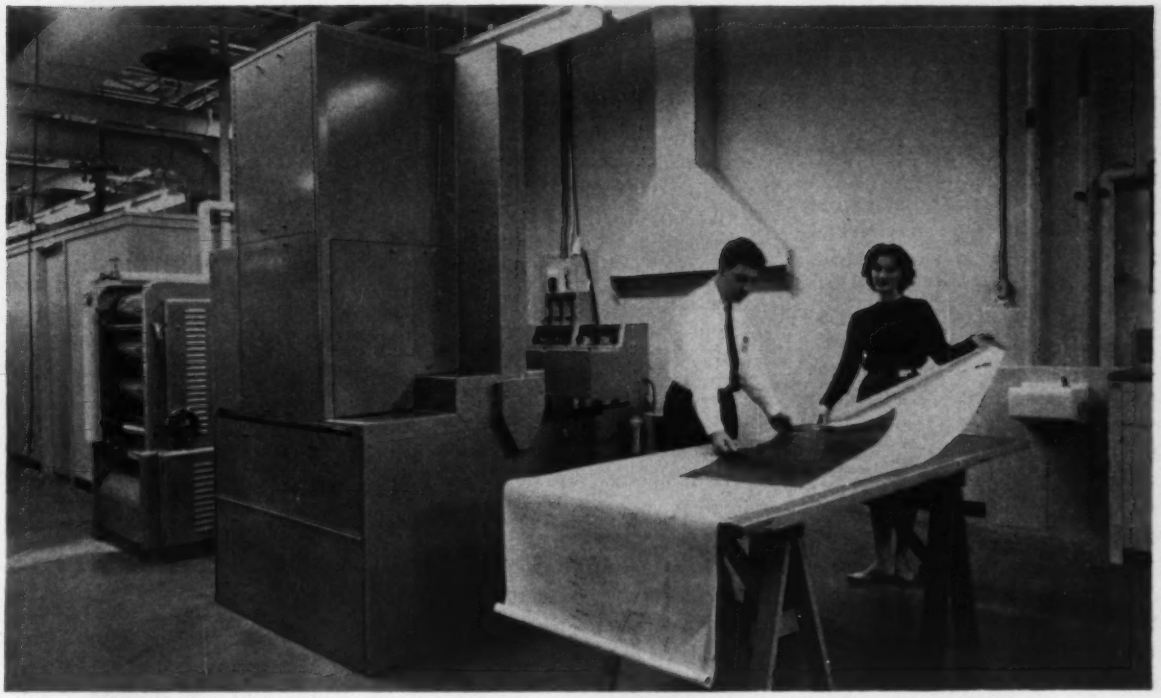
Investment Pays Off—According to Jess Rounds, reproduction department supervisor, "Cost studies conducted by Boeing reveal the actual savings realized through the new program.

"During the year 1960, for example, savings per month ranged from $11,500 in January to $25,800 in December. At present, we reduce to half-size about 95 pct of all engineering blueprints originated at the Transport Division."

The program is the result of work between the engineers in Boeing's reproduction department and specialists from the Paragon-Revolute Div. of Charles Bruning Co., Inc., Mt. Prospect, Ill. Prints are reduced to half-size in a continuous photographic processor and a continuous reducing printer.

To cap off the new system, Boeing has installed two whiteprinting machines, also made by Paragon-Revolute, which make up the needed copies of prints.

Instant Copies — Savings stem from many factors. With reduced size prints, for instance, the same number of drawings can be copied



FEWER FILES NEEDED: The smaller size print creates two-fold savings in paper and filing space.

in less time. Also, the Star whiteprinters run at higher speeds (50 fpm) than the blueprint machines they replaced. The old ones ran at 15 fpm.

The conversion to half-size prints also enabled Boeing to install electric cutting boards and automatic folding machines. These units are used alongside the whiteprinters.

Here are some revealing facts on this phase of the operation. In the new setup, three people working seven hours can print 155 drawings per day, 40 copies each. Cutting and folding are done automatically. It costs $247.23 to handle this workload.

Formerly, this same workload required the services of five people working 11 hours (folding and cutting were done by hand). The cost amounted to $338.32.

Desk-Size Prints—With the new system, prints can be handled more conveniently. The average size of an original drawing is 36 in. wide by about 8 ft long. A reduction of 50 pct makes the print more adaptable to an engineer's desk.

Original drawings from engineering design go first to a checker in the reproduction department. He determines whether the drawing should be reduced, how many copies are needed and the distribution. A select few are not reduced, mainly because of fine details on the drawing.

Those which are earmarked for reduction are sent to the section where the reducing printer and processor are located. First, they are fed through the reducing printer or reduction camera. This equipment is actually a large flow camera. It

THE WHITEPRINTER: Copies of transparencies are made on whiteprinting machines. These high-speed units run at 50 lineal feet per minute.

photographs the drawing as it moves through the machine.

Choice of Size—A series of mirrors and lenses photographs the image on the drawing and reduces it to half-size. The printer, if desired, can handle a large range of reductions to fit specific needs. Any two of several reductions are available, such as one-half and one-third or one-half and one-quarter.

The image of the drawing is transferred by the printer to sensitized paper. This becomes what is called an intermediate transparency. The transparency is then run through the continuous photographic processor, where it is developed, fixed, washed and dried. Once it leaves the processor, it's ready to be used for copies.

The intermediate is next sent to the whiteprinter, where the required copies of the drawing are made and distributed. The transparency is sent to the file. There it can be pulled at a later date in order to make added copies.

Kept in a Vault—Original drawings are kept in a vault. They can be pulled and modified if a sufficient number of changes are made.

Making copies on the Revolute whiteprinters is a fast and simple process. The intermediate or master is fed into the machine on top of diazo-sensitized paper. Both sheets pass through the exposure section of the machine where the image of the master is transferred to the sensitized paper.

The master is then returned to the machine operator via a front receiving tray. He can start making another copy immediately. The exposed paper is carried on through the machine's developing section. There ammonia vapors bring out the latent image.

Copies are discharged from the rear of the machine, where they feed right onto a table. Here they are cut and trimmed as required. They are then carried to a folding machine at the end of the table. As soon as the desired number of copies accumulates, they are sorted into bins according to the distribution pattern.

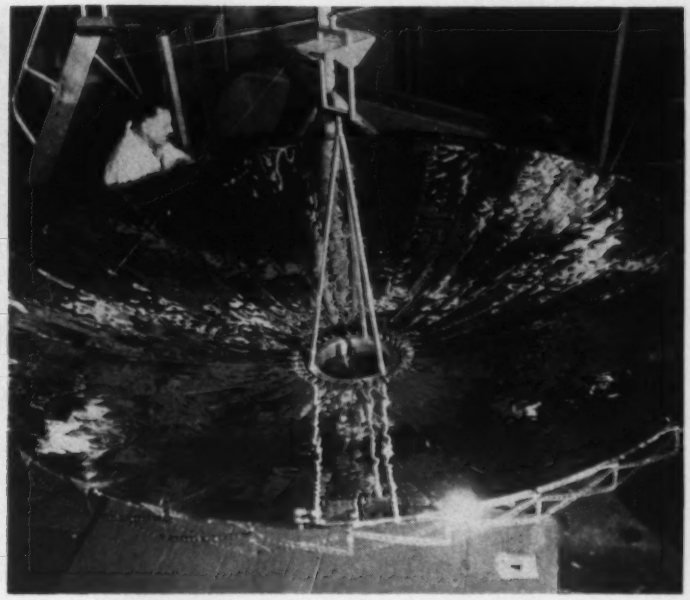
Accent on Speed—The whole operation puts the accent on speed. The reducing printer and the processor run at 20 fpm and 10 fpm, respectively. The whiteprinters operate at 50 fpm. If needed, all speeds can be increased. Top speeds for the printer and processor are 30 fpm, while the white printers can be increased to 75 fpm.

In the developing section of the whiteprinters, a patented feature assures 100 pct contact between the exposed material and the ammonia vapors. The exposed material to be developed passes over a series of perforated stainless rollers which are mounted in the top of the ammonia tank.

Rising ammonia vapors pass through the perforations and contact the paper. This hairline contact between paper and rollers offers an almost total exposure of the paper to the vapors. Reproductions are therefore clear and sharp.

The Transport Division builds other jets for commercial travel such as the Boeing 720 and 727. In addition, the division produces cargo and tanker-type aircraft that Boeing supplies to the military, including the C-135 and KC-135.

END OF THE LINE: Final copies are cut, folded automatically, then sorted for distribution.



UMBRELLA CONCEPT: Solar mirror is a quarter-scale model of one that is planned for orbit. In deployed position, it is 10 ft in diameter. During launch and booster phased, the mirror (left) is folded.

Explosives Shape Solar Mirror

Some of the latest techniques in sheet metal forming were used to build an aluminum mirror.

Mirrors of this type will be orbited into space where they will capture solar energy.

■ Explosive forming and resistance welding are just two modern techniques involved in the fabrication of a solar mirror. The mirror assembly is similar in concept to an umbrella. During boost, the assembly is folded into a 28½-in. diam, 56-in. long unit. Once it's in orbit, the mirror is automatically deployed to a 10-ft diam.

The purpose of the metal mirror is to capture energy from the sun, then concentrate these energies into the power package for engine operation. At launching, the folded assembly will be placed between the satellite payload and the power unit.

The mirror was built by Ryan Aerospace, San Diego. It is about one-fourth the size of the full-scale concentrator planned for the 15-kw power system.

Hinged Blades—The 36 blades of the mirror are hinged at their inboard ends. The hinge axis is so inclined that the blades swing upward parallel to the axis of the parabola. In the folded position, the blades rotate so that their tips are disposed radially.

Surface skin of the blades consists of polished, hard-rolled aluminum foil. Thickness is 0.005 in. To form the skins, Ryan engineers resorted to their own explosive forming methods as well as other sheet forming techniques.

A plaster master tool was produced by sweeping a steel template around the axis of its parabolic contour. At each step of production, the complete reflector assembly was checked optically. The checking system consists of a vertical collimated light beam which is reflected back to a target in the focal plane, thus gaging slope error.

Tooling Up—A plaster assembly fixture and an epoxy-faced explosive forming die were cast, as negatives, against the surface of the master tool. They permitted forming and assembly of the mirror face skin with the reflecting side against the tools. In this way, the support structure could be attached to the rear side.

A special "lattice truss" panel construction was built as the backup structure for the aluminum face skin of the sectors. The mirror blade elements were fabricated by resistance welding.

Why Metal?—The all-metal construction will resist sublimation and the radiation bombardment of micro-meteorites. It also resists other effects of space which might reduce the useful life of structures made from organic materials.

The rigid metal blades and deployment system also permit ground checkout testing of the system under atmospheric pressure and earth gravity conditions.

Tiny Crystals Lock Up Catalyst

Molecular Sieves Yield One-Can Epoxy Paints and Adhesives

Epoxy resins serve in many formulations, from paints to plastics and adhesives.

Catalysts or hardeners are used to trigger final curing. Now, these catalysts can be "caged" inside a blended mix.

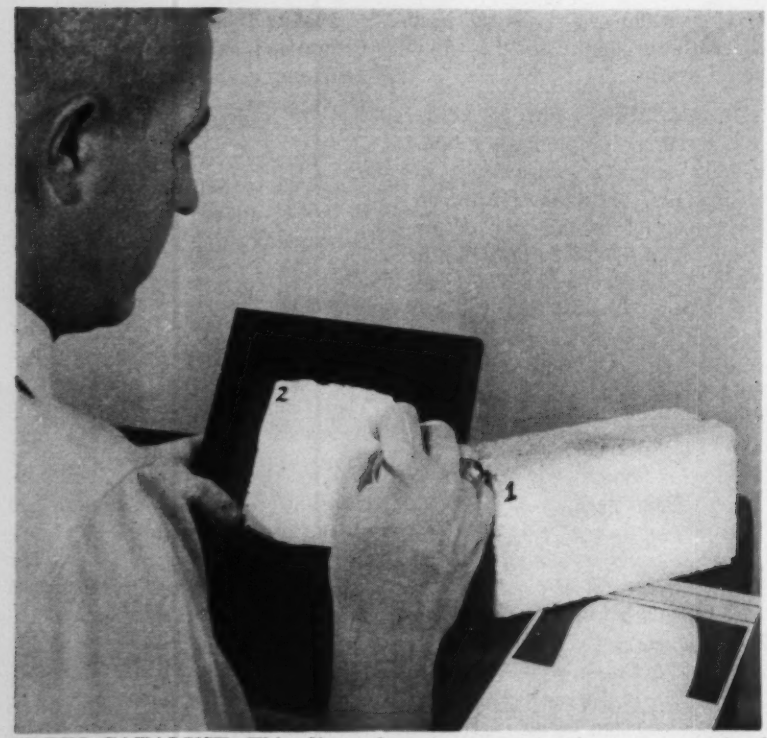
▪ Stable epoxy-resin systems that cure themselves at room temperature are now a reality. This means epoxy coatings, adhesives and potting compounds are ready for use as they're poured from a single can.

Previously, a catalyst or hardening agent had to be stored in a separate package. Just prior to use, a metered amount of the catalyst was added to the resinous compound. Mixing, timing, measuring and curing left a lot to be desired.

Two in One—Dual containers are now a thing of the past. A new chemical composition allows the catalyst to be uniformly blended with—while remaining completely isolated from—the resin.

Premixing of the isolated catalyst with the resin hinges on the development of several types of latent hardeners. These newcomers are called chemically-loaded Molecular Sieves. They're products of the Linde Co., a division of Union Carbide Corp., New York.

Using these latent hardeners, epoxy-resin formulators can convert many two-can epoxy processes into single-can systems. The modified systems insure good shelf life. Their curing rates approach those of the free chemicals. And they give off little heat during the curing stage.



FREES CATALYST: Thin films of one-can epoxy paint cure to a hard finish on porous and nonporous surfaces. Moisture activates the hardener.

Check Savings—Coatings, adhesives and chemical- and rubber-potting compounds which incorporate the Molecular Sieves yield many advantages. For the producer, one-can systems reduce manufacturing costs. Only one production line is needed. Packaging is simplified. Labor costs tumble.

Users also realize major bonuses. Single-can epoxy-resin systems eliminate the waste caused by limited pot life. In addition, there's no more inaccurate-mixing waste.

With less handling and no mixing, you gain more productive minutes out of every working hour.

Safety is another inherent factor with the single-can systems. The use of a "caged" hardener permits the safe use of toxic polyamines.

What is a Molecular Sieve? It's a man-made crystal of metal alumino-silicate. Sometimes it's called a "boiling stone" or a zeolite. When it's heated, this water-bearing mineral gives off its water without disintegrating. It can reabsorb the water as it cools.

Chemicals Jailed — This unique phenomenon can be tailored to suit certain chemicals other than water.

Now, let's study the structure of the dehydrated crystals that make up a Molecular Sieve. These crystals contain a precisely-arrayed network of cavities. All cavities are interconnected by apertures of uniform size. This network comprises almost 50 pct of the crystals' total volume.

Unlike normal absorbents, the pores in Molecular Sieves of any given type are all of the same molecular dimension. This permits quantitative separations between molecules which are small enough to enter the pores. These tiny molecules are absorbed on the active inner surfaces.

The Sieves have a preferential affinity for polar and unsaturated compounds. They store these materials within the cavities without any chemical reaction. Every Sieve retains its high absorbtion capacity at low pressures and over a broad temperature range.

Effective Blockade—In essence, the hardening agent is "caged" within each Molecular Sieve's pore structure. It's completely isolated because the large epoxy-resin molecules can't enter the tiny pores.

At the proper time, the "caged" hardener is released. It can be activated by the application of heat or the introduction of a displacing agent. Moisture from the atmosphere often serves as an active displacing agent.

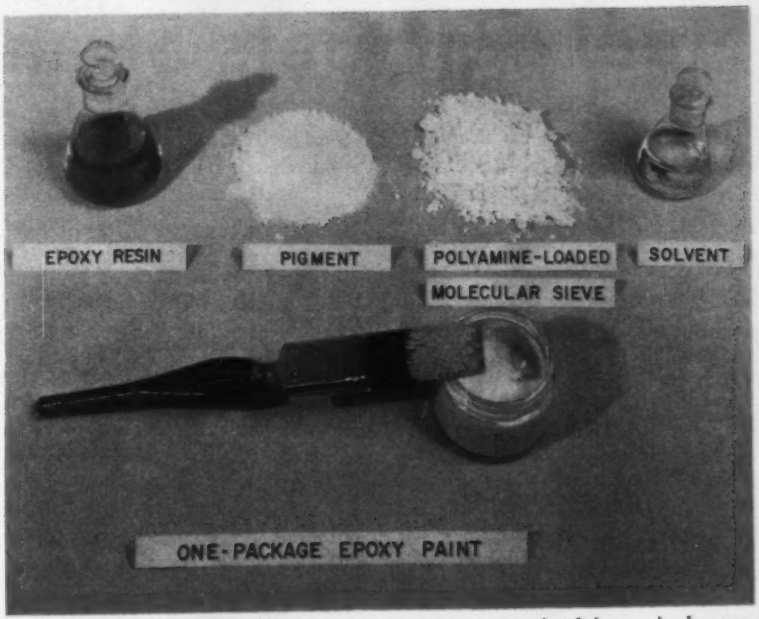
The choice of a chemically-loaded Molecular Sieve product depends upon the cure conditions required. Shelf-life factors and specific applications also affect Sieve choice.

There are three basic types of chemically-loaded Molecular Sieves available for epoxy formulations. They include simple polyamine hardeners, modified polyamine hardeners and tertiary amine catalysts.

Easily Cured—A simple polyamine-loaded Molecular Sieve provides a one-year shelf life. Curing takes place at room temperature when water (atmospheric moisture) serves as the displacing agent. This Sieve system proves useful in adhesive or thin-coating applications. Curing is speeded up by mild heat. Of course, excessive heat creates problems by displacing the moisture agent.

If a coating, adhesive or casting must be heated to 250°-350°F, then you should adapt a modified polyamine-loaded Sieve hardener. Another special modification can be used if the polyamine is to be released by heat alone.

The third Sieve type contains tertiary amine catalysts. These tertiary amines can be released either thermally or by displacement. If desired, you can even combine heat and displacement for fast action.



NO MIXING: Epoxy paint is ready for use as received in a single can. Sponge-like crystals are loaded with an isolated polyamine hardener.

GOOD SHELF LIFE: Jailed curing agent keeps epoxy resin in a fluid state. The fast-jelling mix on right contains a liquid curing agent.

Steel Bolt Gets Strength Hike

Will a steel bolt do the job? What's its strength - to - weight ratio? Airframe designers still keep an eye on economy.

Here's a steel bolt with a 300,000 psi potential. Special components insure the load.

■ What are believed to be the first standard structural bolts rated at 300,000 psi tensile strength are being producted by Standard Pressed Steel Co., Jenkintown, Pa. Besides their high strength rating, the bolts are not subject to brittle fracture.

According to the Dept. of Defense, the high strength material would make possible a 10-20 pct reduction in the weight of aircraft landing gear assemblies. Another use would make possible a propeller-driven aircraft speed above Mach 2.

Several Parts—The new bolt is actually a fastening system. It employs mating locknuts, load-bearing and preload indicating washers and a high strength socket wrench. Use of these allied components is essential to insure the bolt's full strength potential.

Given a bolt of 300,00 psi potential, steps must be taken to insure full use of this strength in application. This is principally a matter of applying a high-enough preload. The recommended preload for the new bolt is 80 pct of yield strength or about 210,000 psi.

This initial clamping force must be applied accurately and maintained indefinitely in both hard or soft materials, and under severe conditions of shock loading and vibration.

Indicates Load—There must be a means for accurately measuring and arriving at the prescribed amount of preload. Ideally, this should be built right into the fastener system. For this, SPS designed a preload indicating washer. It's installed in the manner of a conventional washer.

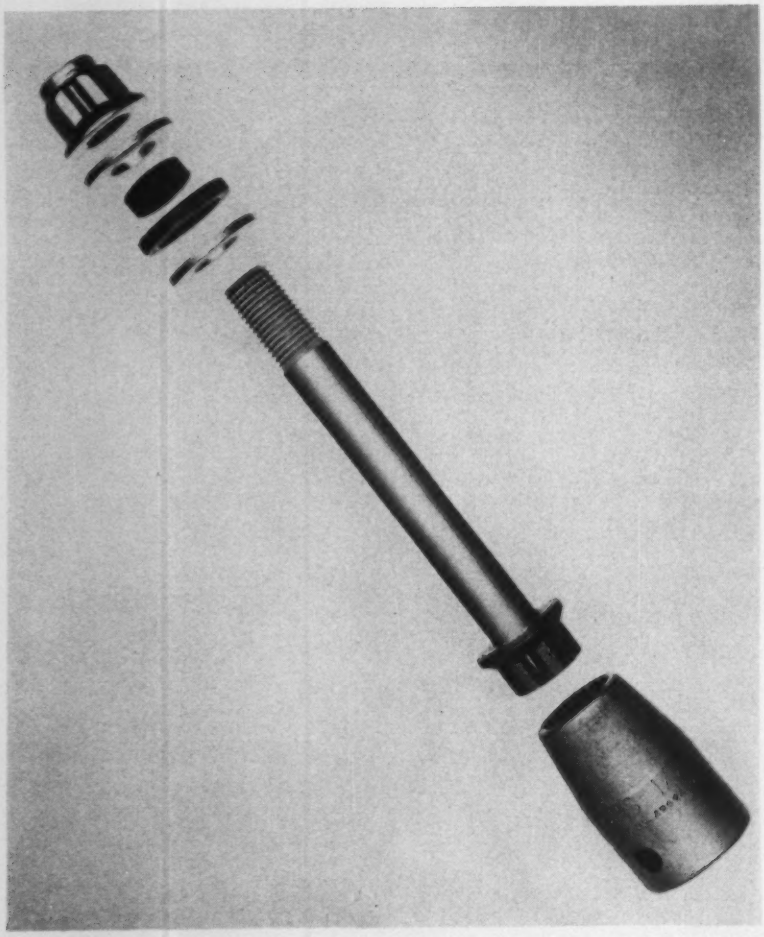
The two concentric rings of the washer are of different height. The purpose is to let the bolt or nut, as it is tightened, compress the thicker inner ring.

The rings' relative geometries are such that when the joint bottoms on the thinner outer ring, the necessary preload is induced within ±10-pct accuracy. This allows visual inspection for quick preload checks.

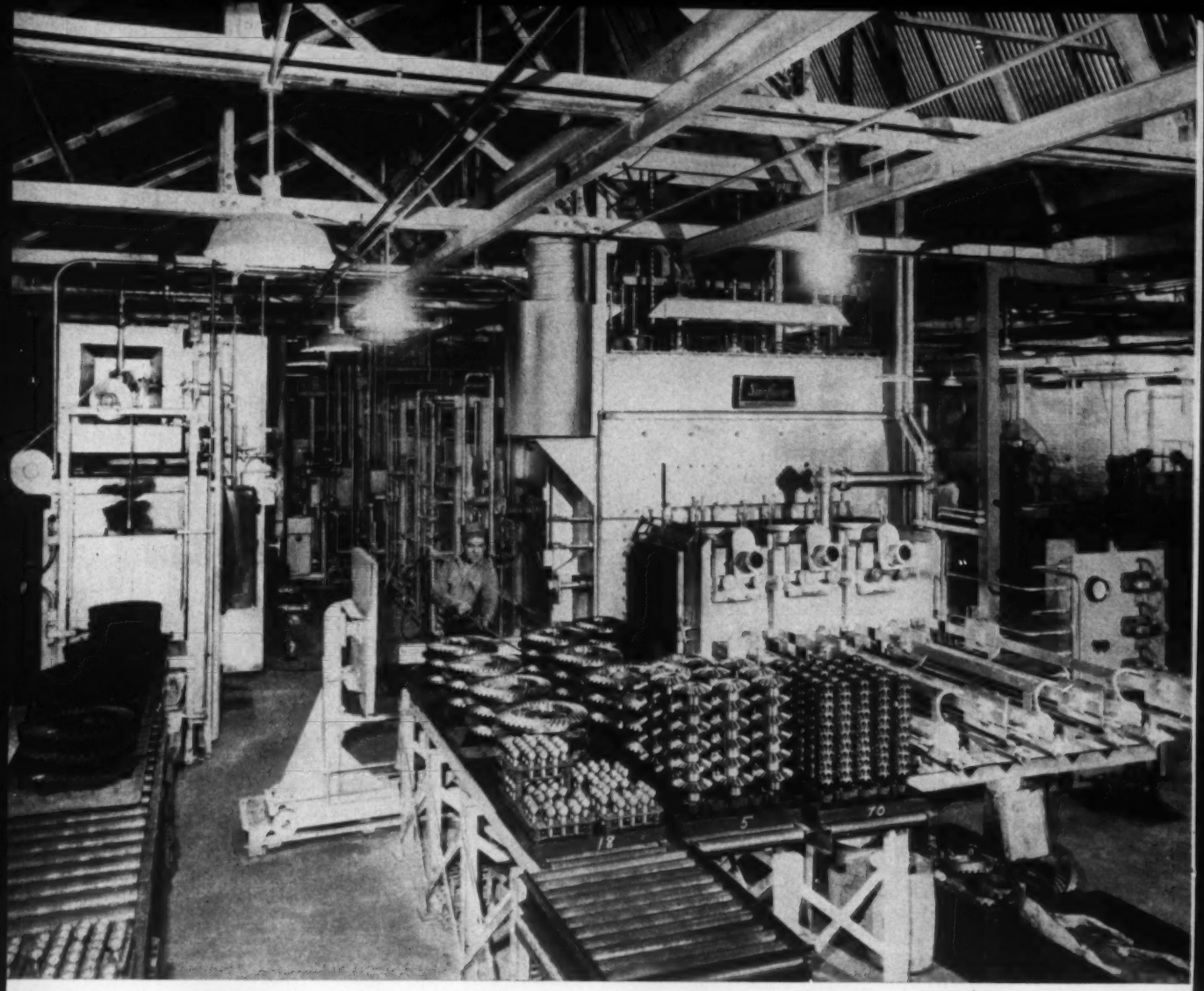
Minimum Strength—The Fastener's double shear strength is at least 180,000 psi with 7.0-pct elongation. Average fatigue life clocks out at 65,000 cycles. This proves that fatigue strength can keep pace with increasing tensile strength.

With the development of this high strength bolt under its belt, SPS feels that strength of steel bolting can be pushed nearer to steel's theoretical limit of about 2,000,000 psi. In fact, achievement of 300,000 psi bolt elevates steel to a point comparable with titanium in the strength-to-weight spectrum.

The bolt is rated for use at temperatures up to 550°F. An elevated temperature series of both tension and shear nuts, for use up to 900°F, is expected shortly.



REQUIRES SYSTEM: The 300,000 psi development is actually a fastening system rather than just a bolt. Allied components must also be used.



Continuous carburizing furnace replaces pack processing at a profit.

Several pack carburizing furnaces have been replaced by one Surface continuous gas carburizing furnace which has paid off for the White Motor Company.

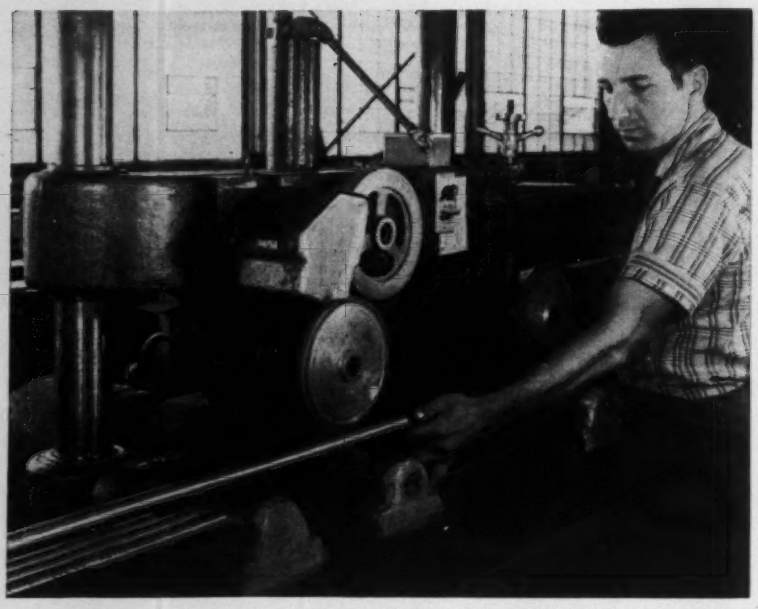
They have improved the quality and uniformity of finished parts as a result of superior process control. At the same time, they are cutting inspection costs and realizing more efficient floor space utilization. Costly supply inventories required by former processes have been eliminated.

Atmosphere carbon potential in two of the five furnace zones is monitored automatically by a Surface Autocarb® System. Parts requiring press quenching are removed through a special slot door at right angles to the regular discharge door. The 57′ furnace carburizes 700 pounds/hour of ring gears, spider gears, studs, pins, and heavy parts.

Write for information: 2373 Dorr St., Toledo 1, Ohio. In Canada: 2490 Bloor St., West, Toronto.

SURFACE

SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR



This Pannier Offset Bar and Tube Printer at the Superior Tube Company, Norristown, Pennsylvania, is shown marking tubing. The tubing moves from the marker right to a delivery table, ready to bundle for shipment.

MARK BARS, EXTRUSIONS AND TUBING QUICKLY, CLEARLY FOR EASY IDENTIFICATION

The Pannier Offset Bar and Tube Printer marks tubing clearly at a controlled rate of up to 450 feet per minute in a wide range of sizes. It is designed to handle rounds from ⅛″ O.D. to a maximum size of 14″ O.D. Simple adjustments compensate for the various sizes of material to be marked, including flats up to 4″ wide. Adjustable side guide rolls are available as optional equipment to permit printing on flat material from 4″ to 14″ wide.

Top surface printing permits constant inspection. Fast drying inks permit immediate handling. The standard offset printer is right-hand feed; left-hand feed is available to fit your conveyor line system without disrupting present line movements.

This unit (Model 8) will print a 24″ continuous legend; Model 12 will print a 36″ continuous legend using either premolded rubber dies or changeable type, which range in size from 1/16″ to 2½″ characters. Fast type setting saves valuable production time and speeds up deliveries. Printing components, which include the die wheel, printing wheel and drive wheel, are available in three sizes, depending on size of the characters desired. Printing components are quickly and easily interchanged.

The Pannier Offset Bar and Tube Printer is available with a ¾ horsepower variable speed motor, or is friction driven from your existing conveyor for continuous flow materials. Power is applied to the conveyor rolls. Movement of the tubing turns a friction drive wheel which turns the printing head. There is no ink buildup on the offset printing wheel, insuring clear marking.

Pannier also has a small model Offset Wire Bar and Tube Printer, which is recommended for printing materials less than 4″ O.D. Pannier engineers will be glad to consult with you on all your marking problems. For complete information, write:

PANNIER MASTER MARKERS
251 Pannier Building
Pittsburgh 12, Pa.

MASTER PANNIER MARKERS

NEW PATENTS

Reduction Treatment

Method for reduction treatment of molten iron-bearing slag to obtain the contained iron by taking advantage of the slag's heat-energy content, L. S. Moussoulos, Oct. 3, 1961. In the recovery of iron values from ferronickel slags and similar slags, an ore-flux reducing-agent mixture is added to the slag in an electric furnace. This mass is heated to optimum temperature to melt the iron and form a new, low-iron slag. U. S. 3,002,832.

Finds Tensile Strength

Non-destructive process for determining the tensile strength of gray-iron castings, R. Ziegler and R. Gerstner, Oct. 10, 1961. In a process for determining the tensile strength of gray-iron castings at certain areas, the speed of ultrasonic impulses through those areas is gaged. Then tensile strength is read from an empirical graph. U. S. 3,003,351.

Iron-Chromium Alloy

Oxidation resistant iron - chromium alloy, J. A. McGurty and J. F. Collins (assigned to General Electric Co.), Oct. 3, 1961. An alloy for use in high-temperature applications consists of 0.1-1 pct Th, 0.5-5 pct Y, 25-35 pct Cr, and the balance substantially all Fe. U. S. 3,002,833.

Machines Easily

Free-machining stainless steel, H. Tanczyn (assigned to Armco Steel Corp.), Sept. 19, 1961. A quench-hardenable, free-machining stainless steel comprises 10-14 pct Cr, 0.07-0.14 pct C, 0.1-1.25 pct Mn, 0.001-0.05 pct P, 0.07-0.5 pct S, 0.1-1 pct Si, up to 1 pct Ni, 0.03-0.35 pct Cb and/or Ta, 0.03-0.5 pct V, and the remainder Fe and impurities. U. S. 3,000,730.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

At Western Electric

MEAKER AUTOMATIC DELIVERS CONSISTENT QUALITY ZINC PLATING FOR MILLIONS OF SWITCH PARTS

How large the world? No more than the minutes it takes to telephone *anywhere!* A pioneer in communications is the Western Electric Company which builds years of rugged service into every piece of telephone equipment produced at its extensive Hawthorn Works, Chicago. Superior performance is a never-ending quest of Western Electric production engineers.

The Meaker "Automatic" was chosen and installed four years ago to zinc plate switch mounting plates and relay covers. These are parts of busy telephone central offices—the communication nerve centers of offices and factories throughout the United States.

Since 1899, Meaker engineers have been building automatic metal processing equipment. These range from units tailor-made to fit limited floor space and handle modest output to the largest plating installation in the world!

Whether large or small, every Meaker is made to save its owner money—through lower labor costs, greater plating uniformity and greatly improved product quality. Send for our new catalog "When to Automate" which will give you some valuable ideas on improving your profits—and products—through automatic plating or metal finishing.

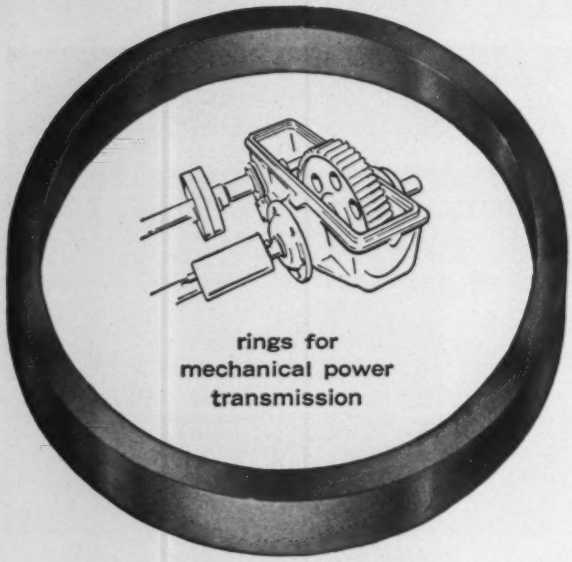
SINCE MEAKER 1899

THE MEAKER COMPANY

SUBSIDIARY OF SEL-REX CORPORATION

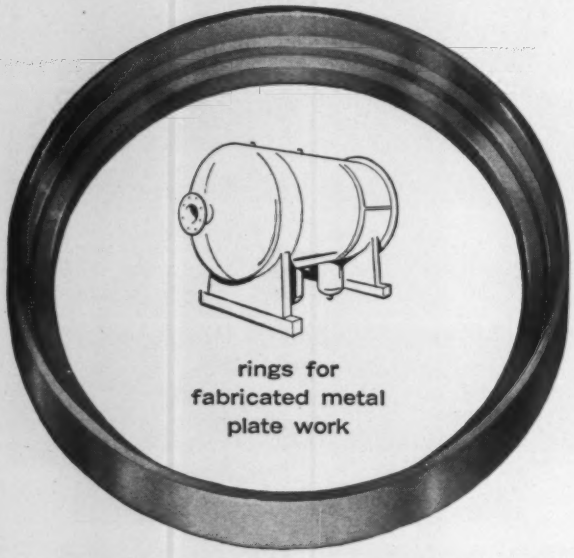
Nutley 10, New Jersey

Factories and offices Chicago 50, Ill., Los Angeles, Cal. and Nutley 10, N. J.

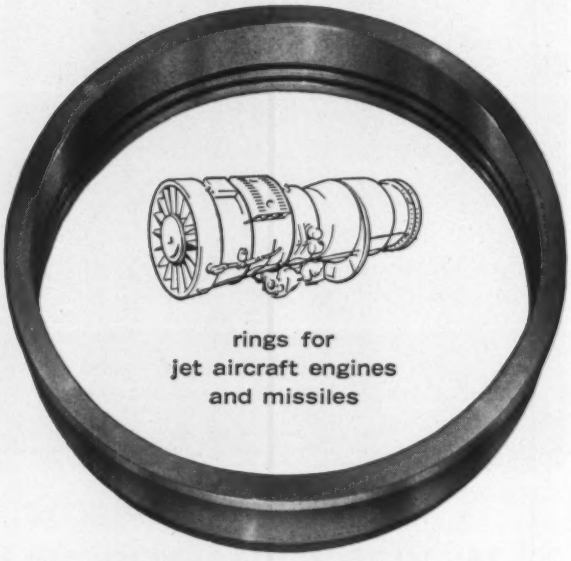


rings for
mechanical power
transmission

rings for
construction equipment
and machinery



rings for
fabricated metal
plate work



rings for
jet aircraft engines
and missiles

we make rings-you save money

Amweld flash butt-welded rings provide a welcome cost reduction opportunity for almost any manufacturer using rings of between four inches and eight feet in diameter from most of the common and exotic alloy metals. Amweld rings save on material because rings are formed closer to finished dimensions. Amweld rings save on machining, because the metal is left out—not hogged out.

Amweld customers saved over one million dollars last year. By close cost evaluation of circular components and assemblies, flash welded rings were introduced enabling substantial savings. It doesn't cost you to think on paper with Amweld. Let us quote you for your cost comparison. Write today: The American Welding & Manufacturing Company, 700 Dietz Road, Warren, Ohio.

AMWELD®
INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MANUFACTURING CO., WARREN, OHIO

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

On Replacing Air

Comprehensive data on direct-fired, make-up air heating is given in a new eight-page bulletin. It urges the use of replacement air to maintain the efficiency of dust, fume and vapor removal from process-equipment atmospheres. (Maxon Premix Burner Co.)

For free copy circle No. 1 on postcard

Alloys Fight Corrosion

A new 60-page booklet begins with the corrosion-resisting properties of molybdenum, copper and nickel; and proceeds to show how investigators have put these elements together to achieve specific degrees of corrosion resistance in the resultant steel alloys. (Climax Molybdenum Co.)

For free copy circle No. 2 on postcard

Valve Sizing

The title, "A Practical Look at Valve Sizing," explains the contents of this four-page technical paper quite simply. It is an explanation in layman's language that tells exactly what appears in undersized, oversized and correctly-sized pressure reducing applications. (Jordan Valve, Div. of Richards Industries, Inc.)

For free copy circle No. 3 on postcard

Power Rectifiers

A guide to semiconductor power rectifiers has been revised and expanded into two volumes, industrial and plating. The 56-page twosome describes semiconductor power rectifiers for every ac to dc application, including: Anodizing, aircraft ground - power supplies, battery chargers, capacitor manufacturing, current limiting, electrochemical processing and relay testing. (The Meaker Co.)

For free copy circle No. 4 on postcard

Brazing Alloys

Listing AWS - ASTM designations, "Ambrase" alloys, and other manufacturer's trade names, a new brazing - alloys comparison chart also details all the important silver-, copper- and brass-base alloys. (American Brazing Alloys Corp.)

For free copy circle No. 5 on postcard

Unseen Asset

A hole—irritating and inconvenient when found in a sock—can be "turned" into an asset when it happens to be through the center of an aluminum rod or bar. This is the gist of a new Alcoa brochure, "The Hole Story." Specifically, hollow-aluminum, screw machine stock is under consideration. (Aluminum Co. of America)

For free copy circle No. 6 on postcard

Drilling Machine

A new brochure covering its "Series A" Automatic Cycle, Drilling and Tapping Machine has just been published by Cleereman Machine Tool Corp. (General Distributors, The Jackson-Fotsch Co.)

For free copy circle No. 7 on postcard

Switchgear

This three-color, 40-page bulletin furnishes drawings, sketches, photos, specs and charts as an aid for designers and engineers concerned with the use of switchgear and circuit breakers. (I-T-E Circuit Breaker Co.)

For free copy circle No. 8 on postcard

Cut-Off Wheels

Precision-made cut-off wheels, for all types of high-speed produc-

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **11/2/61**

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PLEASE TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

.....

City ..... Zone .... State .....

FREE LITERATURE

tion cutting, are the subject of a three-color bulletin. It lists information which aids in the selection of the proper wheel for a particular application. (Dayton Safety Grinding Wheel Div., Simonds Worden White Co.)

For free copy circle No. 9 on postcard

Welder's Aid

Slanted for the user, a compact 4½-page folder provides a handy and authoritative reference to specialty products for welding, soldering and brazing. Alloy-selection charts and convenient product groupings are included for time-pressed welders. (All-State Welding Alloys Co., Inc.)

For free copy circle No. 10 on postcard

Heavy Equipment

An attractive package of folders gives a close look at the Youngstown Steel Car Corp.'s services, equipment and achievements. Categories include: Highway transportation, railroads, off-highway equipment and materials-handling equipment.

For free copy circle No. 11 on postcard

Locking Inserts

This colorful new brochure describes and illustrates a complete pelletizing service. It contains diagrams and data covering standard threaded-part processing—and details on a new process for inserting Nylon pellets into all types of nuts and press-fit parts. (Nylock-Detroit Corp.)

For free copy circle No. 12 on postcard

Product Development

This new eight-page brochure describes a design service for increased efficiency and reduced costs in the office, factory, and laboratory. The companys' specialty is the application of space-age technology in the development of commercial products. (Pacific States Engineering)

For free copy circle No. 13 on postcard

Instruction Manual

Designed to save time and work in installing, inspecting and servicing Holloshaft vertical turbine-pump motors, a new instruction manual outlines various factory-designed procedures. Three main sections cover installation, operation, and maintenance and repair. (U. S. Electrical Motors Inc.)

For free copy circle No. 14 on postcard

Cargo-Handling Aid

Fully-collapsible containers, made of heavy-gage welded wire, are used in manufacturing and for shipping and storing. They accommodate loads from 500-6000 lb. All the details on these unusual containers are set forth in a new 16-page brochure. (Tri-State Engineering Co.)

For free copy circle No. 15 on postcard

Tube Expanders

In 36 pages, this new catalog illustrates and describes a full range of tools for building and repairing boilers and heat-transfer equipment. It gives complete technical data, including specifications. (The Gustav Wiedeke Co.)

For free copy circle No. 16 on postcard

Tool and Die Data

A new brochure discusses an advanced tool and die-making facility. Printed in the form of a file folder, the four-page, illustrated presentation serves as a convenient storage unit for further reference material. (Ehrhardt Tool & Machine Co.)

For free copy circle No. 17 on postcard

Metal Finishing

Chemical compositions for the metal-finishing industry are the subject of a new four-page brochure. Among the chemical applications covered are aluminum processing, electroplating phosphatizing, rust removal, in-process cleaning and paint stripping. (Kelite Corp.)

For free copy circle No. 18 on postcard

Pressure Reduction

Pressure-reducing regulators are the subject of a new eight-page bulletin. This free offering discusses balance, pilot-operated, and direct-acting valves. Service data, connecting-pipe sizes, construction specs, applications, and operational details are all included. (Strong)

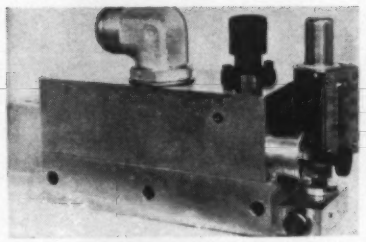
For free copy circle No. 19 on postcard

Welding-Cable Reel

Reels of many types ad sizes are illustrated in a new 80-page catalog. Various application photos illustrate the automatic reels at work. The newest item is a dual welding-cable reel with spring retrieve and 450-amp collector rings. (Industrial Electrical Works)

For free copy circle No. 20 on postcard

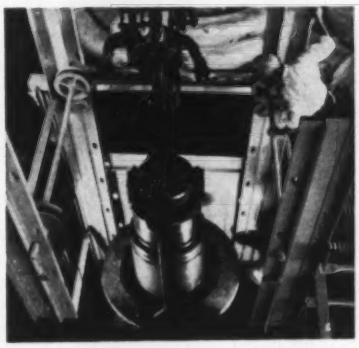
New Materials and Components



Valve Attachments Boost Press Forming Pressures

Improvements in design, production and costs of metal stampings are now possible with a new series of press - intensifier and die - cushion valves, according to the manufacturer. These new press attachments are fixed to the ram of hydraulic and mechanical, forming and stamping presses. They boost the pressure so that the die exerts more controlled force in holding and forming the metal blank. (Hydro-Die Div., Di-Dro Engineering, Inc.)

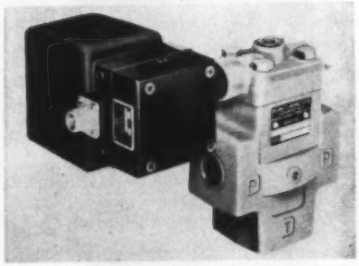
For more data circle No. 25 on postcard, p. 87



Cast-Iron Sleeves Upgrade Back-Up Roll Results

Offering long service life between grinds, cast-iron sleeves for temper-mill, back-up rolls combine the advantages of cast iron with the superior neck strength of steel rolls. Introduction of these sleeves to the rolling-mill trade follows six years of successful testing and production use on the manufacturer's sheet and tinplate temper mills. Records show that since cast-iron sleeves were introduced, as much as 21,530 tons of sheet and 8458 tons of tin plate have run through the temper mills between grinds of the back-up rolls. Not a sleeve has split or slipped in this demanding service. Also, cost studies prove the economy of the cast-iron sleeve and steel-arbor combination under actual service conditions. (Bethlehem Steel Co.)

For more data circle No. 26 on postcard, p. 87



Relief Valve Offers Two Variable Settings

This new ¾-in. hydraulic relief valve features two adjustable pressure settings. It's a pilot-operated unit that's controlled by a motor-driven actuator. The two desired pressures are set by limit switches in the actuator. These settings can be made for any pressure up to 5000 psi. The actuator motor turns an eccentric cam that extends or retracts a plunger. This plunger alters control-spring compression which, in turn, determines how much line pressure is needed to actuate the valve. (Double A Products Co.)

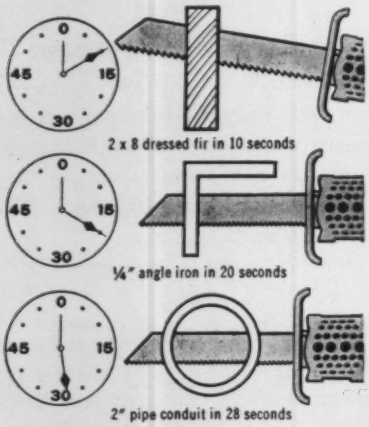
For more data circle No. 27 on postcard, p. 87

Plastic Pipe Coating Withstands Chemical Attack

New Penton-clad pipe and pipe fittings resist the corrosive effects of a wide variety of chemicals. Their chemically-inert thermoplastic coating provides complete inside-outside protection. Such protection is effective from low temperatures up to 250°F, and above. This cladding also boasts outstanding mechanical stability and wear resistance. To apply the resin claddings, a patented, fluidized-bed coating system is employed. Standard metal pipe and fittings are first heated above the resin melting point. They're then immersed in a fluidized bed of finely-divided Penton powder. This powder melts and coalesces to form a firmly - bonded, continuous surface. Fusion bonding also insures good coverage of edges, corners and projections. Clad inside and outside with a 0.025-0.035 in. protective film, the pipe comes in 1½-24 in. diam. (Polypenco, Inc.)

For more data circle No. 28 on postcard, p. 87

New B&D Sabre Saw cuts through all material in less time ...with spunk to spare



Wood and metal turn to butter faster ... with the new B&D power-packed Sabre Saw. Tests prove it cuts through 2x8 dressed fir, ¼-inch angle iron and 2-inch pipe conduit all in less than a minute . . . almost twice as fast as any saw its size! Greater power, new long-stroke action (cutting surface is over 1") make the difference, put more teeth into every job (assure less blade wear).

Wider range of blades, too . . . for all-purpose performance

Choose from a complete new line of Sabre Saw blades—double-edged for pockets and scrolls, single-edged for any job. They fit all other leading saws, too . . . make them cut faster. Buy the new B&D Sabre Saw with five all-purpose blades at leading distributors everywhere.

Black & Decker
CUTS MAN-HOURS TO MINUTES

THE BLACK & DECKER MFG. CO.
TOWSON 4, Maryland 0911
(In Canada: Brockville, Ont.)

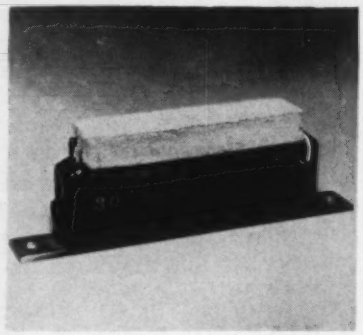
☐ Please arrange a demonstration of B&D Sabre Saw.
☐ Please send additional information on B&D Sabre Saw.

Name----------Title----------
Company----------
Address----------
City----------Zone----State----

DESIGN DIGEST

Spray-On Heaters

Custom "sprayed-on" heating elements provide a solution to heating-element problems where a stable temperature environment is mandatory for the reliable operation of electronic components. For example, one such heating element on a transistor oven has an internal temperature control which maintains environment at 92°C ± 1°C. Watt density is sufficient to provide an initial temperature rise from as low as —45°C to +92°C in less than 15 minutes. The combined conductive and insulating coating of the sprayed-on heaters is only 0.015-in. thick. This allows the heat flow to spread rapidly and

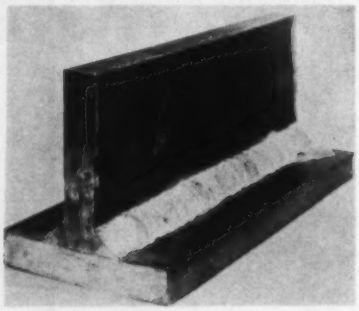


evenly over all areas of the oven. The result is an extremely small temperature difference between the actual element and the parts to be heated. In addition, these heating elements are extremely reliable, and they may be applied to flat, cubicle or contoured surfaces of any kind or size. Total weight of the element and insulation is only 0.07. lb. per sq ft. (Electrofilm, Inc.)

For more data circle No. 29 on postcard, p. 87

Fills Copper Welds

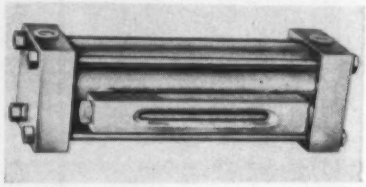
Berylco 25 or 165 has been found to be an excellent filler for welding beryllium copper plate or rod. It works equally well on joining other materials such as stainless steel, medium carbon steel, Inconel, or copper, to beryllium copper. Using this filler, welds joining beryllium copper plate show strengths exceeding 95 pct that of the parent metal before aging or annealing. Annealing and aging produce even better properties. Welding is done under controlled argon atmospheres on hand-operated or automatic Mig or Tig equipment. Chemical variation between weld wire and weld deposit was undetectable by normal chemical tests. Development of this technique for using beryllium copper as a welding material should lead to wider use of beryllium copper in pressure vessels, cryogenic vessels, wind-tunnel nozzles and machine fabrications. (The Beryllium Corp.)



For more data circle No. 30 on postcard, p. 87

Rugged Level Gage

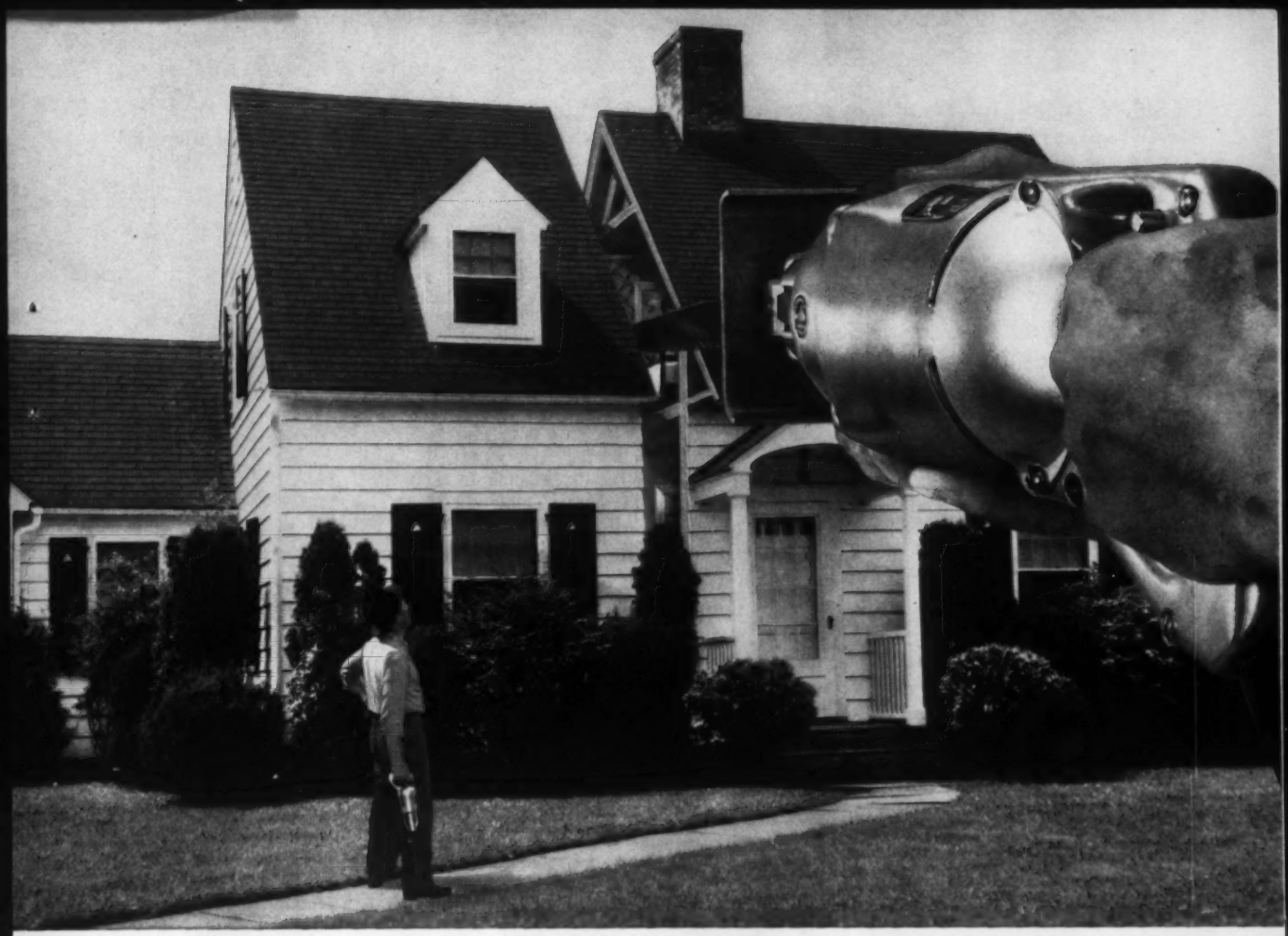
Here's a new gage that's practically breakproof. A glass tube is recessed within a square solid-brass casing which mounts directly to the tank barrel. This affords ample protection against breakage. It also helps to keep the gage clean of dust and dirt. Mounting the unit to the tank itself reduces maintenance, since you don't have to dismantle the liquid-level gage when tank end caps are taken off or loosened. (The Milwaukee Cylinder Co.)



For more data circle No. 31 on postcard, p. 87

Hydraulic Circuit Aid

Hydraulic circuit trouble-shooting time can be sharply reduced by means of a new indicating light now offered on a line of hydraulic valves. This light indicates when power is being applied to a solenoid. It's



The saw that could cut a house in half!

New B&D Sabre Saw with longer cut goes through wood, metal, plaster

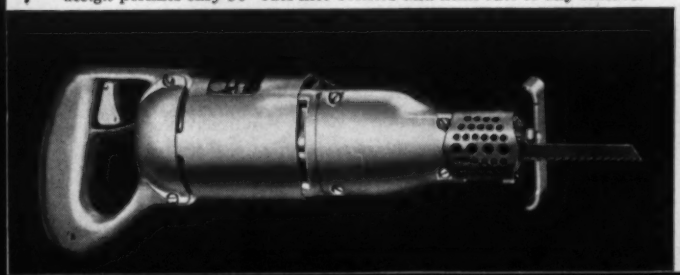
It stops at nothing! The new Black & Decker Sabre Saw power-cuts clean through wood and plaster, metal pipe and sheet . . . all as easy as you please with exclusive long-stroke action. Unique rock 'n' lock shoe design makes your work easier yet. Blade spindle turns 90° and 180° to cut in any corner, cut out any pocket. You grip right behind the safeguard blade guide for up-front control. You'll find the Sabre Saw's vibration is the lowest ever . . . its balance perfect for the most accurate cutting. Just try the new B&D Sabre Saw one time . . . and you'll see how it *could* cut a building in two, any time.

For sales and service, look in the Yellow Pages of the telephone book under TOOLS ELECTRIC

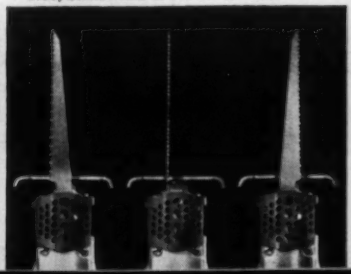
Black & Decker®

CUTS MAN-HOURS TO MINUTES

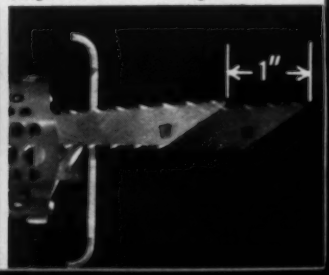
Safeguard blade guide allows grip close to cut for up-front control. *Offset-design* permits easy 90° cuts into corners and flush cuts to any surface.



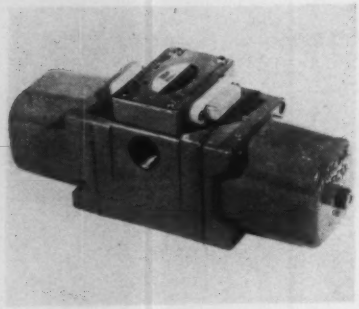
Adjustable blade spindle for right, left, backward or forward cuts.



Long-stroke action provides a cleaner cut, faster work and longer blade life.



available on ⅛-, ⅜- and ¾-in., 3000-psi, solenoid-controlled valves. It can also be added to any of these valves already in use or in stock. In addition to telling at a glance if power is being supplied to a sole-

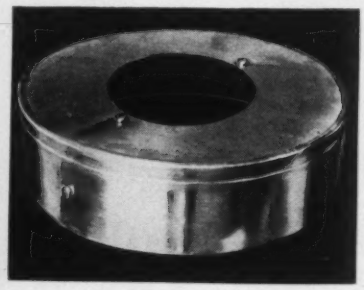


noid, the signal light has these advantages: It speeds up the initial check of newly-installed electrical systems; shows if opposing solenoids are being energized simultaneously; eliminates pilot-light wiring to the panel; and cuts costly downtime when you're trying to locate a trouble source. The light consists of a neon bulb with a properly-sized resistor to insure exceptionally long life. (Racine Hydraulics & Machinery, Inc.)

For more data circle No. 32 on postcard, p. 87

Speeds Pipeline Work

Here's a brand-new product to speed insulating and covering of pipelines. Designed to fit where insulation stops at valves, flanges and unions, the new end caps are fully preformed and ready to install. These units eliminate the need for beveling of insulation and blacking or water proofing the end of the insulation with mastic or other materials. Formed from 0.024-in., 3003-H14 aluminum, the caps are made in two halves. In place, they extend up over the straight pipe for two inches. This overlap provides a watertight seal with the jacket-

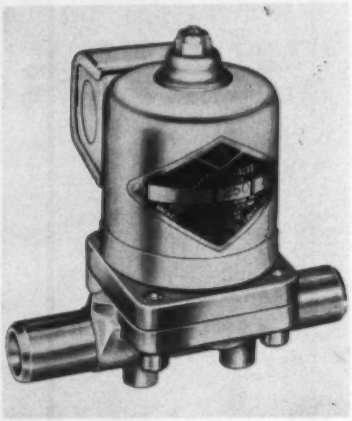


ing on straight pipe sections. The end caps are protected from corrosion by a sprayed-and-baked epoxy moisture barrier. (Premetco)

For more data circle No. 33 on postcard, p. 87

Solenoid Valves

Normally-open solenoid valves, specifically designed for use on Refrigerants 12, 22 and 500, are now on the market. Units come in port sizes from ¼-1¼ in. with either pipe or sweat connections. This new design answers the need for this type of valve in many refrigerant applications where valves of this type were previously unavailable. Using a normally-closed valve in these cases requires the use of reversing relays to get normally-open action. In other words, in order to have a normally-closed ac valve stay open all the time, you have to keep the coil energized. These new valves remain open without energy.

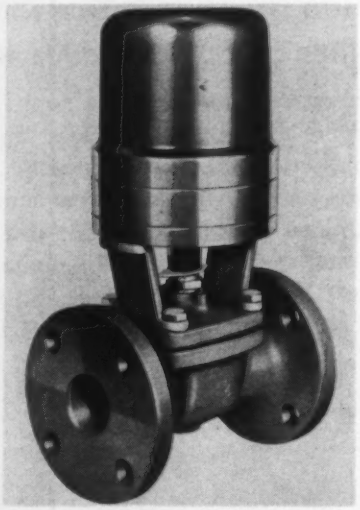


The practical result is much longer coil life. (Jackes-Evans Mfg. Co.)

For more data circle No. 34 on postcard, p. 87

Top-Entry Valves

Top-entry ball valves are now available with electric operators for automatic and remote on-and-off, flow-control applications. The operators come as an integral part of the valve, or separately for bolting directly to the bonnet of any valve already in service. Features of the new operators include: Weatherproof and explosion-proof construction, stainless-steel output shaft, aluminum housing, and hardened-steel gear train. Cycle time to fully open or fully close the valves is



5-12 seconds, depending on valve size. The valves themselves are available in 1-8 in. sizes for pres-

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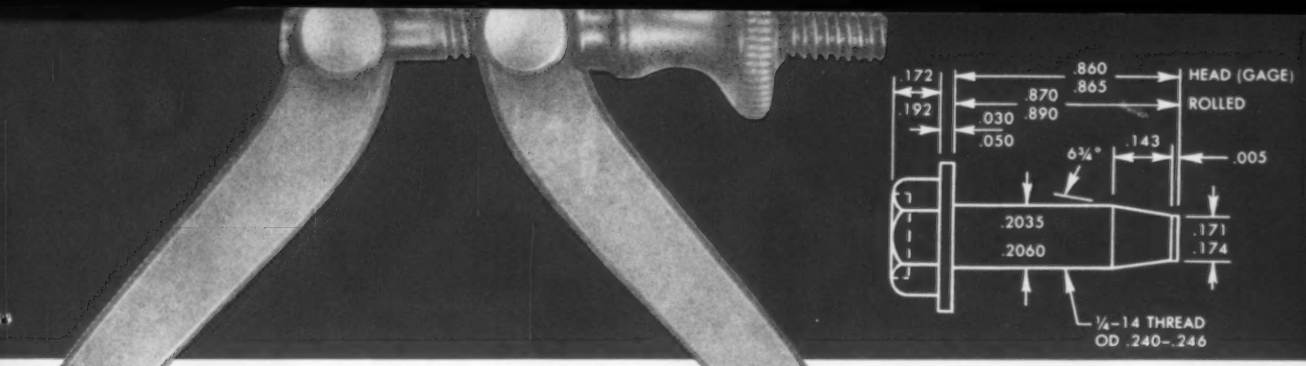


300% UPSET

. . . crucial cold heading done with KEYSTONE WIRE

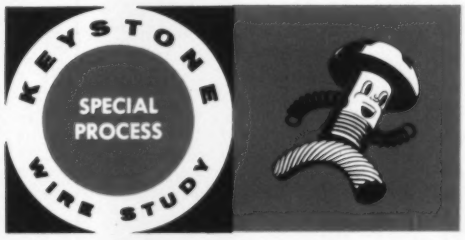
To upset an indented hex washer head sheet metal screw with a thin washer 300% larger than the original wire diameter calls for good tooling and superior quality wire. Such a screw is cold headed on a 2-blow header by Midland Screw Corporation, Chicago, Ill., from Keystone Special Process Wire.

Ed Wick, Customer Service Coordinator, has exceptional praise for Keystone Wire. He says, "In cold heading this sheet metal screw we have had our best success with Keystone C-1018 Special Process Wire. We like to work with this wire. A big factor in its selection is the uniform quality throughout the coil, correct thermal treatment and flowability characteristics—as well as excellent service and dependable deliveries from Keystone Steel & Wire Company."

If you are looking for a high quality wire with delivery you can rely upon, it will pay you to investigate Keystone Special Process Wire.

Keystone Steel & Wire Company, Peoria, Illinois

MIDLAND *Fasteners*



KEYSTONE

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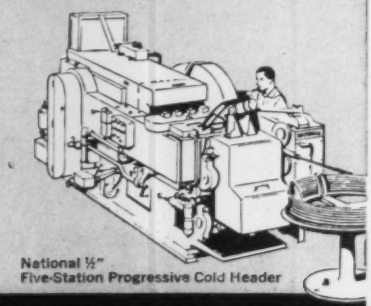
These important parts are cold-formed from wire, start to finish in compact, efficient National Cold Headers.

Practically scrapless, all these parts achieve remarkable savings over past methods.

If you make odd-shaped parts, may we help you evaluate them for cold-forming from wire? Better yet, come to Tiffin, witness our demonstrations and let's discuss your work.



National ½" Five-Station Progressive Cold Header

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U.S.A.

HARTFORD DETROIT CHICAGO

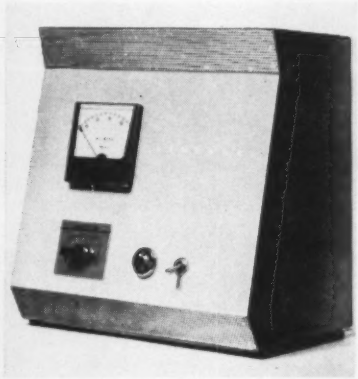
DESIGN DIGEST

sures to 720 psig and temperatures to 1000°F. Ductile-iron, carbon-steel, stainless, bronze, and aluminum bodies are standard with screwed, socket, or flanged ends. (Hills-McCanna Co.)

For more data circle No. 35 on postcard, p. 87

Power Control Units

Lightweight, transistorized silicon-controlled-rectifier power-controls are now available for use in heavy-duty industrial applications. They provide stepless control of power from zero level to the full-

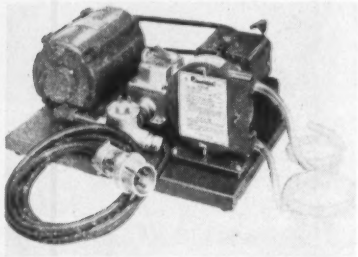


rated kw of each unit in the series. The power output is controlled either automatically or remotely by a milliwatt d.c. signal. A built-in voltmeter provides easy reading of power output to protect any process. All components are designed and installed for easy access and, while many uses are contemplated, precise control is achieved when the unit is used with proportioning systems. Shown, is the 4 kw model. Others in the series are: 8 kw, 16 kw, 35 kw and 70 kw. The 4 kw and the 8 kw are air-cooled; the 16, 35 and 70 are water-cooled and are available either for mounting on a wall or in the control panel itself. (Lindberg Engineering Co.)

For more data circle No. 36 on postcard, p. 87

Safety-First Pump

Here's a new pump which can be used with absolute safety in explosive atmospheres. In this unit, which was designed for the handling of corrosive, sterile, or abrasive liquids or gases, there is no contact between the moving parts and the material being pumped. Now available with a ¼ hp, explosion-proof motor, ex-



plosion-proof switch, flexible conduit and explosion-proof plug, the pump is ideally suited for pumping flammable liquids and gases. (The Randolph Co.)

For more data circle No. 37 on postcard, p. 87

Bantam Regulator

Two models of a very-small pressure regulator are now available—one with a gage port and one without. Both feature all-brass construction with a neoprene diaphragm. Dimensions are 2½-in. high x 17/16 in. wide. The valves handle primary pressures up to 400 psi regulating them to the range 5-125 psi secondary pressures. Both models deliver up to 80 cfm at 100 psi

with a 200 psi inlet pressure. Maximum operating temperature is 200° F. (Wilkerson Corp.)

For more data circle No. 38 on postcard, p. 87

Unusual Connector

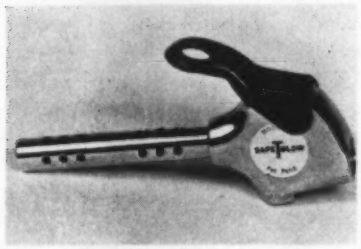
Although it looks like a coil spring, this device is actually a

new-type electrical connector. It's expected to supplant the familiar binding-post and nut arrangement used to connect telephone wires in terminals. With the coil-spring connector, wires can be hooked up rapidly, without initial stripping of insulation. Here's the principle of operation. The spring wire is square, instead of round or oval. When insulated wire is looped around the spring once, and pulled tight, it forces its way between two turns of the coil. Sharp, square, connector edges bite through the plastic insulation and contact the wire. (Bell Telephone Laboratories)

For more data circle No. 39 on postcard, p. 87

Cuts Nozzle Pressure

These Safe-T-Blow air nozzles were designed to serve in air sys-

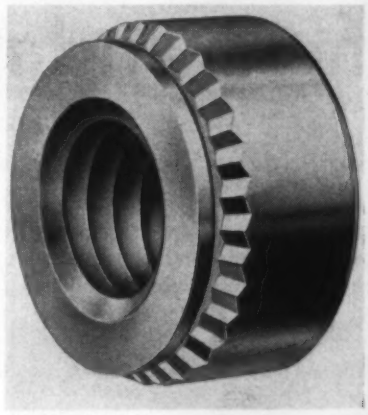


tems where both high- and low-pressure demands are placed upon a common compressed air supply. A pressure of 100 psi minimum is normally required for pneumatic tools. Good safety practice usually restricts this pressure when it's used for cleaning and dusting purposes, and here's where the new nozzles enter the picture. They provide a large volume of air at low pressure and low velocity. They also eliminate any regulating controls. And, they're low in cost. (Jet Electronics Corp.)

For more data circle No. 40 on postcard, p. 87

Threaded Inserts

A new series of self-anchoring threaded inserts, for sheet metal installations, employ a unique angular knurl which prevents loosening, once the insert is in place. Screw tension applied to the thread serves to pull the angular knurl more firmly against the gripping surface of the hole. Thus, the higher the torque applied by the screwdriver, the tighter the grip of the insert. Threads are installed by pressing

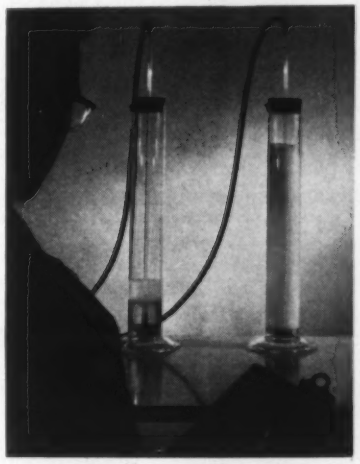


them into a single hole in sheet metal as thin as 20 gage. Made of case hardened steel, the inserts are cadmium plated. The inserts are available in eight thread sizes from 4-40 to ¼-28. They are quickly installed with standard shop tools. (Southco Division, South Chester Corp.)

For more data circle No. 41 on postcard, p. 87

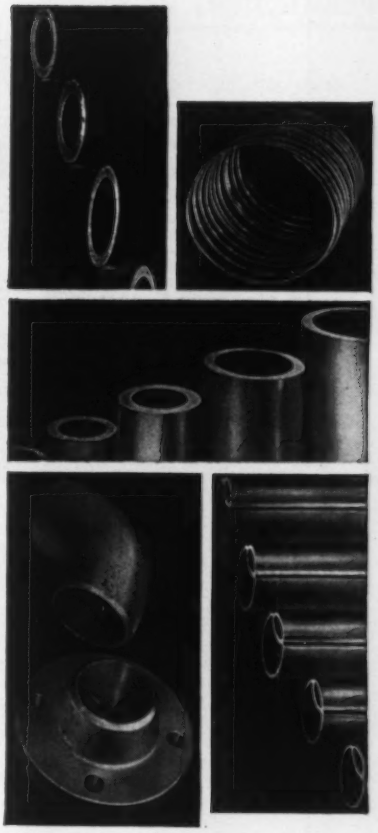
Fluorosilicones

With many of the properties of their silicone cousins, these new fluorosilicone fluids, greases and compounds feature exceptional resistance to solvents, fuels and chemi-



cals. They also resist heat, cold, and oxidation. Included in the products are grease-like valve lubricants and lithium soap-thickened lubricants as well as rubber-like sealants that cure at room temperature. (Dow Corning Corp.)

For more data circle No. 42 on postcard, p. 87



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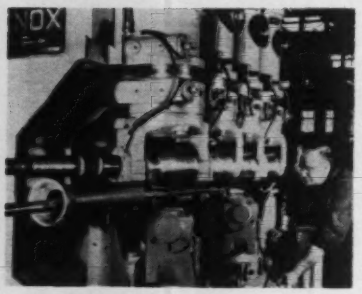
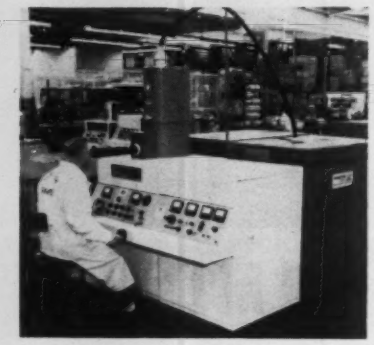
New Equipment and Machinery



High-Speed Tube Straightener has Six-Roll Action

A new rotary straightening machine comes in a variety of standard sizes to handle round bars, pipe or tubular products, ⅛-24 in. in diameter. Its advanced design completely eliminates any shoe or rubbing guides at any point on the straightener. Instead, workpieces of all sizes are entirely contained by the rotating surfaces of the six feeding and straightening rolls. These rolls are arranged vertically, allowing the input and output tables to be set at a fixed height. Balanced feeding torque prolongs roll life and eliminates distortion of the tubing due to roll drag. (Blaw-Knox Co.)

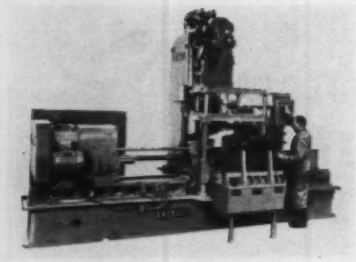
For more data circle No. 43 on postcard, p. 87



Electron-Beam Machine Yields High-Purity Welds

Major features of a new electron-beam welding machine include: Low total energy input to the workpiece; precise control; and negligible contamination of the workpiece during welding. Low energy input is inherent in the electron-beam method since fusion penetration does not depend on thermal conductivity of the material. There are two practical benefits, here. Because distortion takes energy, a low energy input minimizes workpiece deformation and has little effect on the properties of the workpiece. As for power control, with different settings, this one machine will weld 0.002-in. copper ribbons to the edge of a nickel-plated ceramic wafer; or join a 1-in. section of 18-8 stainless steel with equal ease. (United Aircraft Corp.)

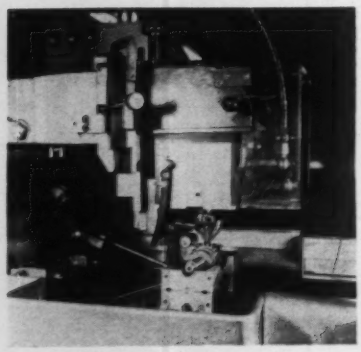
For more data circle No. 44 on postcard, p. 87



Line Boring Machine Includes Bonus Operations

Primarily, this custom transfer-line machine performs semifinish and finish boring on the cam and crankshaft bearings of engine cylinder blocks. But it doesn't stop there. The new unit also finish bores two dowel holes at each end of the block, as well as finish machining the distributor hole and milling a boss on the underside of the blocks. Tolerances on the distributor hole and on both dowel holes are held to within 0.0005 in. All tools mount on standard precision boring spindles. (Ex-Cell-O Corp.)

For more data circle No. 45 on postcard, p. 87



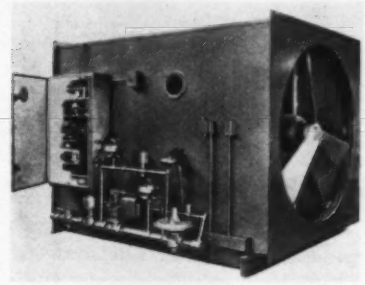
Induction Heating Units Boast Great Versatility

Through a cross-licensing agreement with Delapena & Son, Ltd., of England, a U. S. machine-tool company is now offering a versatile line of oscillator-tube and motor-generator heating equipment. One outstanding feature of this new equipment is the use of an air-cooled oscillator tube which lasts six times longer than conventional water-cooled units. It also has a much higher intermittent rating. In addition, the cabinet is sealed and air cooled. This just about eliminates the use of water cooling. Other advantages include three principal devices for varying the output power. The trio gives you the control necessary to maintain top efficiency under all operating conditions. (National Automatic Tool Co., Inc.)

For more data circle No. 46 on postcard, p. 87

A Warming Effect

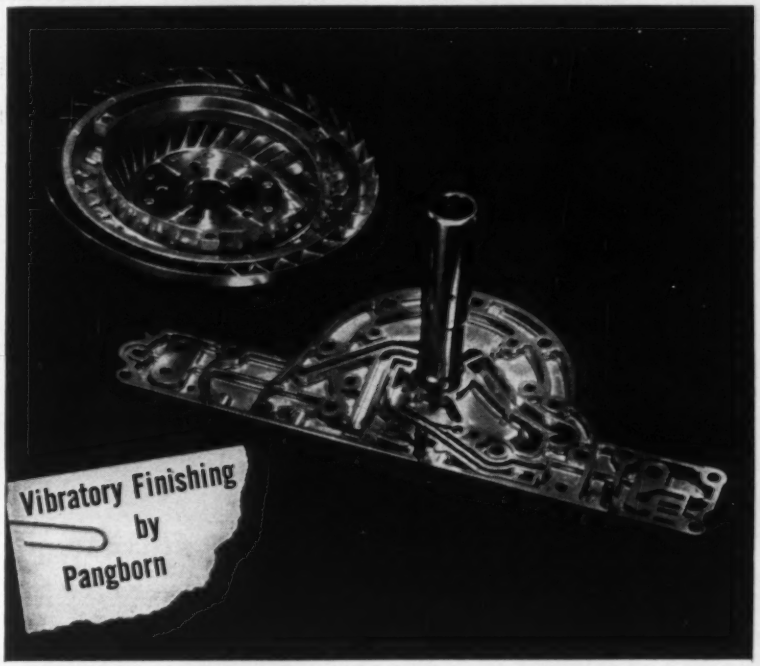
Unbalanced ventilating systems and negative building pressures handicap industry in the winter. However, a new-type of make-up air unit will solve this problem. It's a self-contained, gas-fired device that introduces comfort-tempered air into working areas. Three basic sizes, providing a total of six different ratings, are available. Air deliveries range from 22,000-70,000 cfm. Btu ratings from 2,125,000 to 5,375,000 are offered. For special jobs, other sizes and ratings may be obtained. All units incorporate the new burner design which delivers 100 pct of the available heat in the gas. Complete modulating controls provide a 25:1 turn-down ratio, permitting effective performance under all outdoor temperature conditions. "Summer-winter" controls also enable the units to be used for hot-weather breeze cooling. The combustion system is combined with airfoil propeller fan into a compact unit assembly with an overall length of only 8 ft. Completely factory assembled and tested prior to shipment, the units require only a simple adjustment of the pressure regulator after gas and power supplies have been connected. This feature eliminates costly set-up procedures. (Propellair Div., Robbins & Myers, Inc.)



For more data circle No. 47 on postcard, p. 87

Induction Transformers

During recent years, more and more foundries have turned to induction heat as a compact, dependable heat source in their melting equipment. Induction melting disperses metals throughout the melt, automatically. It causes no carbon pickup; and it has an extremely-low alloy loss. Also, it readily reproduces identical melt compositions; it's highly efficient on intermittent operations; and it turns out sound ferrous and non-ferrous castings of high quality. Motor generators are usually the power source in such installations. Now, however, a frequency transformer has been perfected for use as a power supply. This new static frequency unit fills the need for a low-cost, low-upkeep power supply for all types of induction melting and heating applications. According to the manufacturer, for larger melting jobs requiring 100-500 kw capacities, they are more economical than motor-generator sets. The frequency transformer has no moving or rotating parts. In principle, it is similar to a magnetic amplifier; in appearance, it resembles a transformer combined with a number of standard capacitors for maintaining a high-power factor. New units come completely assembled. They require no foundations or expensive parts, as in conventional-melting techniques. Inex-



Suddenly complex finishing has a simple solution!

The Pangborn Vibratory Finishing Machine has an unusually wide range of application. What would you like to descale, deburr, radius, finish or burnish?

Metal and metal alloy as well as many plastic and ceramic parts may be vibratory finished. This machine processes extremely small and delicate items with the same facility it handles large and heavy objects.

What's more, the Pangborn Vibratory Finishing Machine performs as much as 100 times faster than conventional equipment. Cuts costs? You bet!

All sizes of the machine come equipped with variable speeds and amplitudes plus new improved air-cushioned suspension. Optional air-cushioned floor mounts completely eliminate any transmission of vibration to the floor. Auxiliary equipment and the best in media and compounds are available for your every need. Send parts with exact finish specifications or finished specimen for sample processing in our laboratory to Mr. William E. Brandt at:

PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada Ltd. 47 Shaft Rd., Toronto (Rexdale), Canada — *Manufacturers of Vibratory Finishing, Blast Cleaning, Dust Control Equipment — Rotoblast® Steel Shot and Grit®.*

Pangborn
OF HAGERSTOWN

BETTER STAINLESS WELDS WITH ARCOS

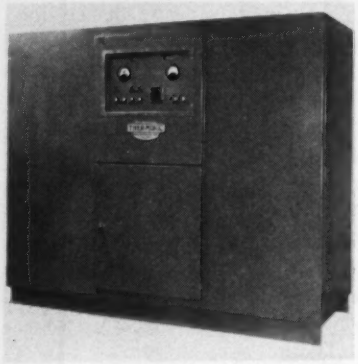
Arcos produces a full line of stainless filler metals...coated electrodes, bare electrode wire, consumable inserts, bonded fluxes. This across-the-board selection of filler metals, plus Arcos stainless welding know-how, assures you of the selection of the right filler metal for the most economical arc-welding process—manual, semi-automatic or automatic. Where you use Arcos stainless filler metals you build up the quality of your welds and push down your welding costs.

ARCOS

Arcos Corporation • 1500 S. 50th St. • Philadelphia 43, Pa.

NEW EQUIPMENT

perienced operators can quickly become expert in operating the transformers, since they're virtually automatic. Damage by overload is

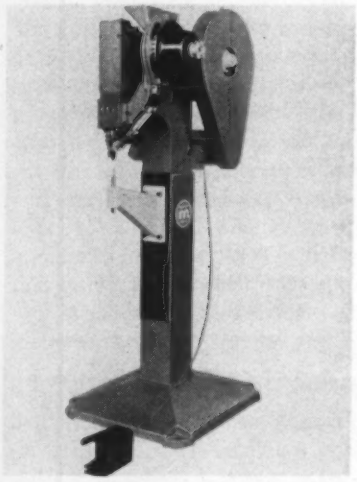


impossible. Output power may be varied continuously under load conditions from about zero to full output, with an inherent overload capacity of 30-40 pct. Moreover, several heating stations may be operated from this single power source. (Induction Heating Corp.)

For more data circle No. 48 on postcard, p. 87

Sets Heavy Rivets

A new single-spindle rivet-setting machine handles semi-tubular rivets up to 3/16 in. in diameter and 1 in. long during heavy-duty, long-run production. The unit's 3½-in. stroke



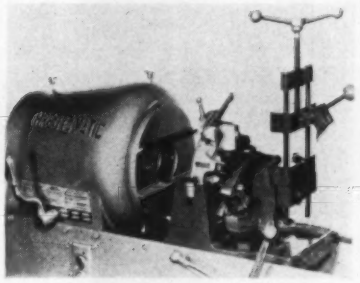
allows space for loading components and unloading riveted assemblies. A flexible cable has been provided with the standard mechanical-clutch trip switch so that the foot trip can be conveniently located by the opera-

tor. In addition, the rotary hopper is fitted with a handwheel so that with a few turns, the hopper barrel can be quickly pulled free for easy change-over to another rivet length. (The Milford Rivet & Machine Co.)

For more data circle No. 49 on postcard, p. 87

Automatic Threader

Five major features distinguish a new precision threading and cutting machine. There's a totally-enclosed automatic double chuck with a complete choice of mono, dual or universal scroll-adjustment die heads, all with built-in automatic oil flow. These heads may be ordered with attached reamers so that threading and reaming are done at the same



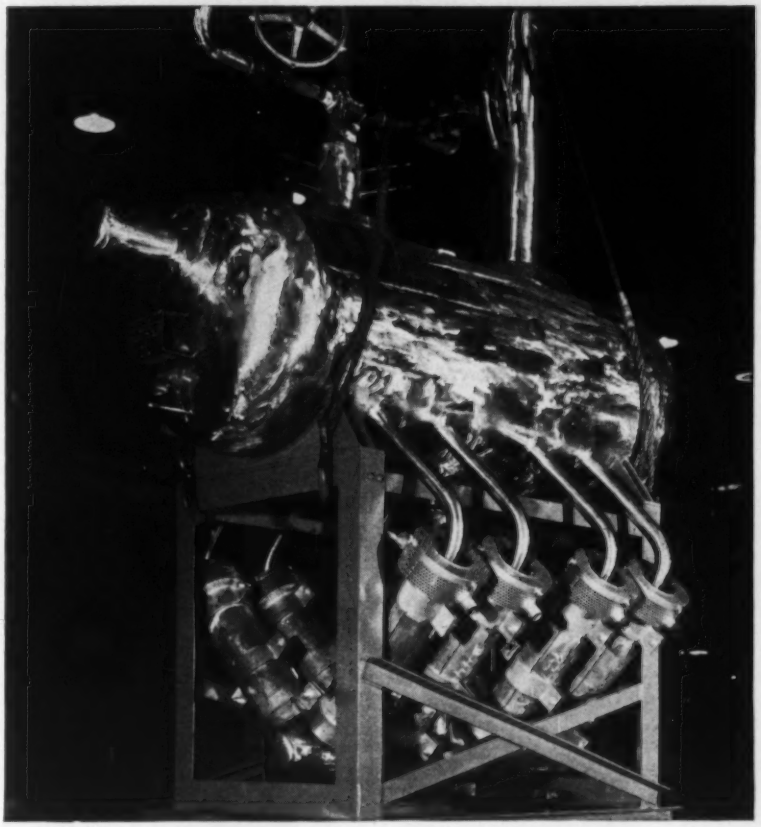
time. Also, the position of cutter and reamer assemblies can be interchanged. Finally, the unit is specifically designed for make-on and teardown fittings. (Collins Machinery Corp.)

For more data circle No. 50 on postcard, p. 87

Improves Combustion

An entirely-new chemical method improves and controls the combustion process of coal or oil in all types of industrial boilers. This combustion improver is actually a patented complex of metallic catalysts, first developed during research for solid-fuel rocket propellents. Blended in a liquid carrier, these catalysts aid in disintegrating slag and scale deposits throughout boiler gas passages and combustion area. The product also prevents corrosion from high sulphur-vanadium fuels. It reduces excess air without increasing smoke potential and it prevents the alloying effect of certain slags with tube metal. Boilers treated with this new product have passed annual inspections without manual cleaning. Operators

ARCOS EB INSERT FOR ROOT PASS WELDING



Job report courtesy of Dominion Bridge Co., Ltd., Montreal, Quebec

Smooth, crack-free root welds made in nuclear pressure vessel from one side only. This NRU reactor surge tank is made of Type 347 stainless, 3" thick with 26" I.D. It is designed for operation up to 630°F. at 2400 psi. Because welding could be done from the outside only, Arcos EB Consumable Weld Inserts were used for the root passes. Result: complete fusion, crack-free, with smooth inner surface. Write today for complete data on EB Weld Inserts.

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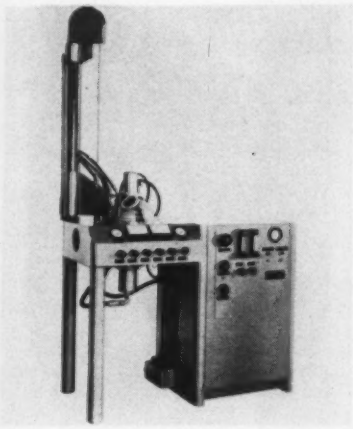
report the distinct improvement in combustion has been responsible for decreasing neighborhood complaints about smoke or stack emissions. (Harco Chemical Co.)

For more data circle No. 51 on postcard, p. 87

Arc-Melting Furnace

In standard applications, a new arc-melting furnace adapts to non-consumable button melting, and both consumable and non-consumable general melting. It creates ingots up to 3-in. in diameter and 7-in. long, by either a vacuum or inert atmosphere process. Where extreme purity is required in processing buttons and ingots of refractory metals, a melting gun may be furnished for electron bombardment in a vacuum. This is the only technique for handling these metals without electrode contamination. For normal use in button or non-consumable melting, a tungsten tip is provided for the electrode holder. A manually-driven materials feeder can also be adapted for non-consumable melting. High purity of the non-consumable melted

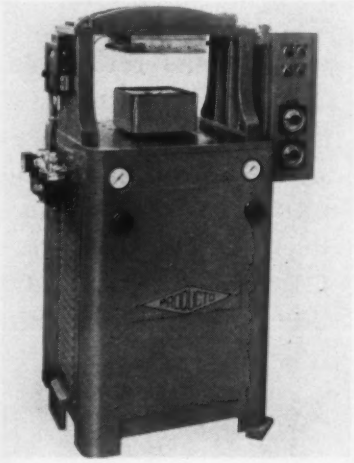


material is obtained by the use of a water-cooled tungsten electrode and a water-cooled copper crucible for the ingots. This consumable-electrode processing can handle a melting electrode 24-in. long x 2-in. diam. (High Vacuum Equipment Corp.)

For more data circle No. 52 on postcard, p. 87

For Plastic Forming

Pressure-formed plastic products can be developed, and the formability of plastics can easily be determined, on a new pushbutton-controlled pressure forming machine. Ideal for sampling and development



work in the laboratory, the newcomer can pressure form 8 x 8-in. plastic samples to a maximum depth of 4 in., at temperatures up to 600°F. The maximum platen stroke is 5 in. Reliable heat and pressure systems, pushbutton control, and semi-automatic cycling help make the machine dependable and efficient. Compact in design, the unit needs only 24 x 36 in. of floor space. Heavy construction insures long, trouble-free performance. (Plastic Machinery Div., The Producto Machine Co.)

For more data circle No. 53 on postcard, p. 87

Precision Boring Tool

With only one setup, a new device provides high-precision boring, facing—with rapid-traverse return, and grooving. The tool can also be used to produce counterbores, back counterbores, OD turning, chamfering, and both ID and OD grooving. As

a boring head, the new tool provides two unique features: Its easy-to-read graduated dial extends around the entire body and reads directly to 0.001 in.; and its large vernier permits adjustment to 0.0001 in. In addition, you don't need to lock the tool during finish-boring cuts. Usually, locking moves the tool. Thus, when you're working in "tenths," any chance for accuracy is lost. The new leadscrew and nut hold the tool tightly without creep, providing full accuracy of the adjustment. The tool comes in three sizes. Both smaller units provide 0.0025 ipr facing feed, and 0.100 rapid return. The largest provides 0.005 ipr feed and 0.200 return. (Maxwell Industries, Inc.)

For more data circle No. 54 on postcard, p. 87

Low-Cost Welding Unit

With a current range of 30-225 amp, a new low-cost, all-purpose arc welder boasts ample power for

An important source for North American high-speed and specialty steels

ATLAS STEELS

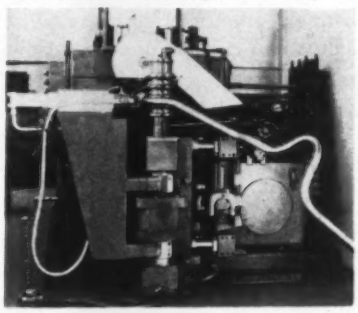
the bigger jobs that require large electrodes up to 3/16 in. It operates with any type of ac electrode,

including low-hydrogen and stainless steel. Duty cycle is 20 pct. The desired heat stage is easily obtained by turning an easy-to-reach dial on the front of the machine to any of its 12 stations. An On/Off switch is incorporated as an integral part of the heat controls. To minimize cost of electrical installation, a line cord is included. (Bren/Weld Corp.)

For more data circle No. 55 on postcard, p. 87

Tailpipe Bender

These machines apply numerical control to automate the bending of tubing to any required configuration, in large or small quantities, and without the need for elaborate tooling. Both machines are called Bend-O-Matic. Both use punched tape to



program the bending of straight tube stock to desired angles and contours, accurately and economically. One model, specifically designed for producing the bewildering variety of tailpipes required by different makes and models of cars and trucks, sequences automatically to complete a tailpipe in an average time of 2-2½ minutes. This lets the manufacturer

AUTOMATIC BRUSHING SETUP buffs mirror finish on 12" wrench parts for plating. Multiple parts are mounted in special removable fixture. Machine automatically positions and oscillates parts between brushing heads for 25 strokes per cycle. Each head is made up of 65 Osborn Bufcut® treated cord brushes.

MIRROR FINISHING wrenches
nine at a time with OSBORN power brushing

This leading tool manufacturer uses Osborn power brushing to buff a mirror finish on forged steel wrenches, pliers and chisels before plating.

Pre-mounted in multiples on removable fixtures, the tool parts are buffed in a special machine which automatically lowers and oscillates the parts between two Osborn Bufcut® brushing heads. The operation is simple, fast, inexpensive. This method has been in continuous use in this plant for nearly 12 years—*still proves to be the best way to do the job today.*

It's a typical example of how Osborn power brushes and brushing methods—through years of exceptional, dependable service—are handling industry's tough metal finishing jobs. If you have a metal finishing problem—deburring, cleaning, polishing, precision blending—an **O**sborn **B**rushing **A**nalysis, made in your plant at no obligation, can pinpoint the answer. *Write or call The Osborn Manufacturing Company, Dept. F-116, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

OSBORN

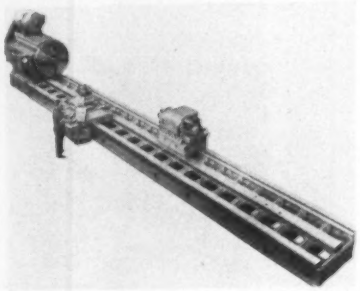
Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

produce various tailpipes as they are required. Another similar machine is designed for general industrial use. Applications exist in the following areas: Complex fuel and hydraulic lines for aircraft, missiles, and similar vehicles; piping for chemical processes; and other systems where bent piping is used. (Baldwin-Lima-Hamilton Corp.)

For more data circle No. 56 on postcard, p. 87

Three-Way Lathe

Heavy-duty, general-purpose and roll-turning lathes are now available in sizes ranging from 32-92 in. swing over the bedway. They incorporate a number of innovations designed to increase productivity, improve accuracy and reduce handling time. For instance, there's more rigid support of the work because the cutting-force resultant falls between the front and middle ways. It is not necessary to extend the tailstock quill to reach across the carriage bridge in facing the end of the workpiece. The carriage will pass completely by the tailstock. This



feature, plus the steady-rests, results in less setup time. This is particularly effective when two carriages are used on long lathes. The carriage is arranged for the application of numerical and/or tracer control. The new feed incorporates a sectional threaded rack with a pair of large, adjustable screws for backlash control. As the rack sections are short and accurately spaced, there is no limit to the length of bed that can be supplied. This new carriage-feed system eliminates the need for a lead screw, rods, shifter mechanisms, etc. Result—a cleaner machine, less maintenance and fewer distractions for the operator. (Farrel-Birmingham Co., Inc.)

For more data circle No. 57 on postcard, p. 87

Versatile Hand Shear

Major improvements upgrade a portable metal-cutting shear. The unit is now capable of cutting cable

up to 1½-in. diam. It will also cut 1⅜-in. round stock, 1¼-in. square reinforcing bars, 3¾-in. flat, and 2½ x 5/16-in. angle iron. Formerly, a separate shear was required for cutting cable. Now bridge, road,

RA 330® brings the space age **CLOSER**

RA 330 supports rocket cases in pit furnace 10 ft. diameter by 30 ft. deep.

RA 330 provides strength at 1900° F. to support, without fear of dropping, a 3500 pound load; resistance to thermal shock of rapid heating and air quenching; resistance to furnace atmosphere and oxidation.

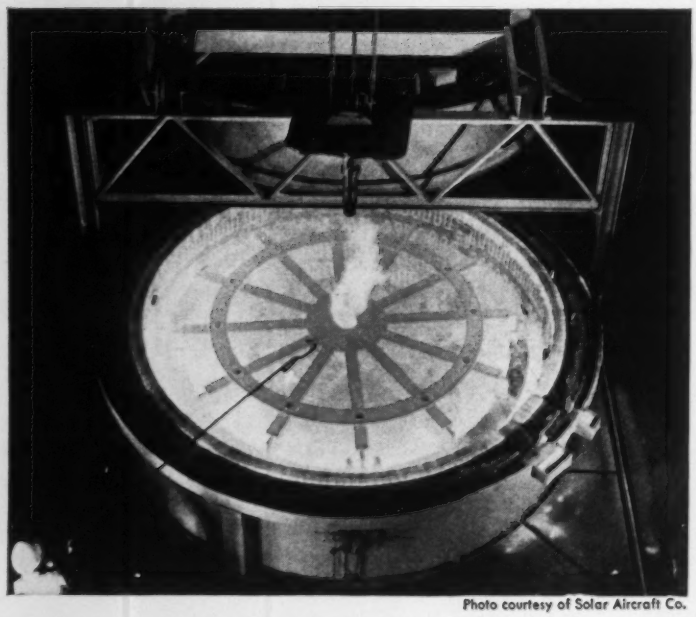


Photo courtesy of Solar Aircraft Co.

Based upon highly successful use of RA 330 in other applications with temperatures ranging up to 2250° F., Solar Aircraft Company selected RA 330 for this critical application.

For best performance specify RA 330 for your heat treating fixtures and furnace parts.

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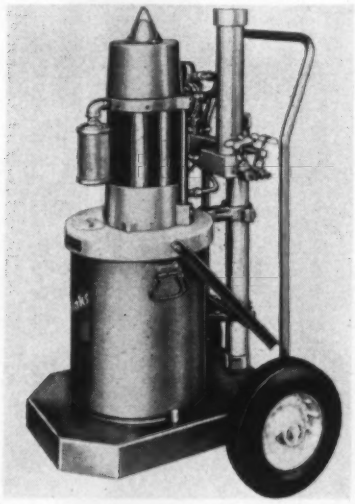
and building contractors, shipyards, utilities, and manufacturers can perform all of these metal-cutting operations with just one portable, hand - operated shear. (Edwards Mfg. Co.)

For more data circle No. 58 on postcard, p. 87

Airless Spray Painter

Designed for high-volume, multiple-gun operation, a new airless-spray unit features a 21:1 pumping ratio. Available in two models, it will pump 3 gpm under continuous-duty conditions. One model is a 10-gal portable unit designed for



on-site, multiple-gun operation. It mounts on a roll-around cart. The other model is designed to pump direct from 55-gal, original material containers. Its basic pumping unit is similar to the portable model, and both will handle the large orifice tips necessary to apply thick coatings. (Binks Mfg. Co.)

For more data circle No. 59 on postcard, p. 87

Tough Floor Coating

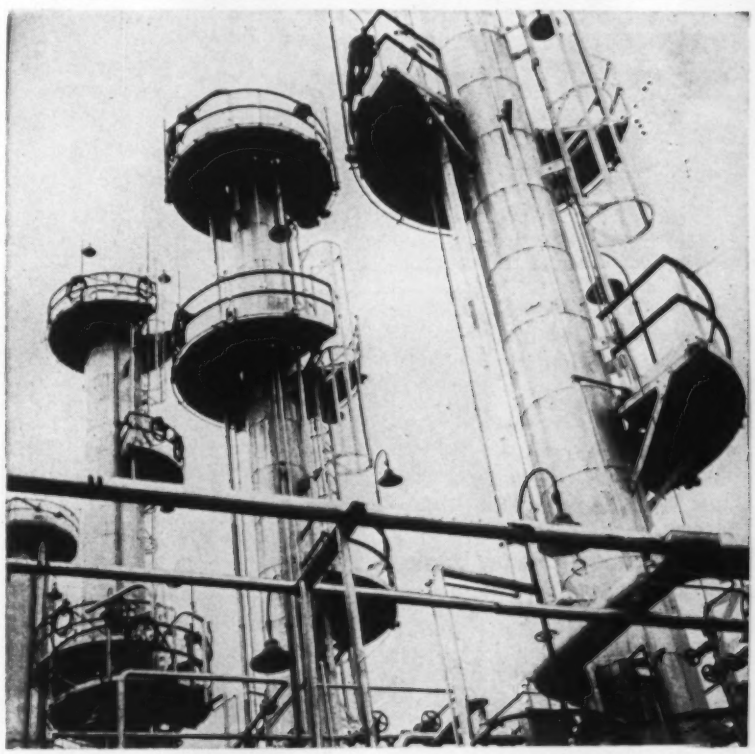
After extensive field tests, a new epoxy surfacing compound for floors and other surfaces is now on the market. When applied ⅛-¼ in. thick, this product equals the strength of up to 2 in. of concrete. Since it can be feather-edged, it's particularly suited for patching or overlaying of concrete, wooden, or steel floors; surfacing walls; and lining the inside of tanks. Providing an impervious alcohol- acid- and abrasion-resistant surface, the compound is ideal for quick maintenance and repair of factory floors, roadways, reservoirs, culverts, airport runways, bridges, silos, and tanks. (Dennis Chemical Corp.)

For more data circle No. 60 on postcard, p. 87

Press Setup

Progressive die tooling is being used to make film-spool end caps. Ansco's R. G. Carr, production supervisor, reports: "This transfer press has increased production 36 pct with a corresponding decrease in labor costs." In operation, coiled stock is automatically fed into the transfer press in predetermined feed lengths. A nine-station die performs the following operations: Blank, first form, score, trim, draw, pierce, extrude, crimp, eject. Rated capacity is 15 tons. Stroke is 1¾ in. (The Baird Machine Co.)

For more data circle No. 61 on postcard, p. 87



Industry's main arteries

Stainless steel pipe and tubing carry the lifeblood of industry --particularly in the chemical and petrochemical fields.

Kobe Steel's extruded pipe and tubing, are entirely seamless and completely dependable whether made of steel or alloy steel. Uniform in quality, they have great resistance to extremes in temperature and pressure.

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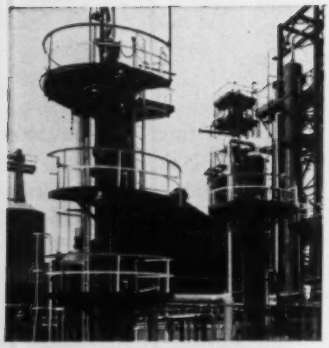
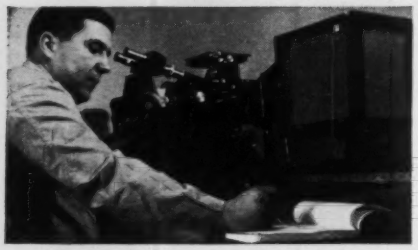
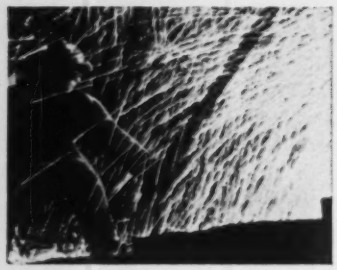




Thirty-six million dollars in new facilities . . .



At Alan Wood, capital expansion totaling $36,000,000 in a two year period is part of an overall plan to serve you well today . . . and tomorrow. New rolling and blooming mills have stepped up Alan Wood capacity for service. Our fully integrated operation cuts red tape, gives you uniform quality . . . consistently and on time. Order your steel plate, your sheet and your strip from the company that offers the combination of capacity, quality and delivery!

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Steelworkers Make Strike Plans

Job security talk among the steelworkers indicates rough going in next year's negotiations.

Tough talk by union and steel companies may lead to a big surge of strike hedging next year.

■ The steel industry and the United Steelworkers of America are stiffening their demands in advance of next year's steel labor negotiations.

The USWA is preparing to take a militant position on principal issues. From the top ranks down, the union membership is getting ready to take a strong stand and preparing to back it up.

Goal Is Security—Job security is foremost in the minds of steelworkers. They are concerned about technological unemployment and the union's final demands will be built around security measures. Furthermore, the union has the added incentive to beat the contracts won by the United Auto Workers in this fall's negotiations.

While it is too early to assess the industry's position on all the issues, there has been no easing in the industry's determination to avoid an inflationary contract, to improve work standards and to assure management rights.

Inventory Angle—This strengthening of union-management positions takes on added significance in view of the low level of steel stocks throughout the country. As the pattern of negotiations takes form early next year, steel users are likely to go into one of the greatest inventory-building periods in years—at least up to the 1959 rate.

For this reason, the steel mills are becoming increasingly concerned by the current apathy in inventory building. This is not just scare talk. Many users are living off mills' current ability to deliver on short time. With any bulge in orders from major users like the automakers, many consumers would find themselves in trouble.

Can Get Caught—And any major inventory buildup by the big users after the first of the year will leave many steel consumers with little or no steel stocks to balance against lead times that will jump over night from weeks to months.

This will come at a time when overall business is likely to show a major improvement and a strong demand for both consumer and industrial products.

Looking ahead to a strong pre-negotiation buildup and a tight steel market next spring, it is likely to reflect a pattern that may be repeated as long as steel labor contracts are of several years' duration.

Market Outlook—The pre-negotiation buildup will be followed by an inventory liquidation period. This will be accomplished either forcibly by a strike or by a long period of only minimum steel buying.

In the general market, steel orders continue to show a slow improvement. There are some soft spots in individual products and in some localities. But, overall, new orders are gaining, although slowly and at a rate that lags behind most earlier estimates. The big disappointment to date has been the auto industry, hit by a series of strikes followed by less-than-expected steel orders. In anticipation of a rush early next year, some mills are building stocks of semi-finished.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	111	111	113	85
Buffalo	101	103	103	89
Pittsburgh	105	105	107	73
Youngstown	98	100	100	75
Cleveland	115	115	148	96
Detroit	133	112	147	106
Chicago	110	108	114	85
Cincinnati	127	128	129	87
St. Louis	127	128	114	99
Southern	101	111	108	78
Western	121	117	115	79
U. S. Index	110.4	109.6	114.4	82.9

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,057	2,042	78,721	86,026
Ingot Index				
(1957-59=100)	110.4	109.6	98.3	107.4
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$34.50	$37.83	$39.17	$28.17
No. 2 bundles	$24.17	$25.17	$26.17	$18.50

PURCHASING

Bearings Buyers Turn to Space

New aerospace and scientific developments have opened a new market for bearings makers.

Buyers at SKF Industries are keeping pace with the new trends, as the industry changes direction in the face of new challenges.

▪ More and more bearings makers are turning to consumable electrode and induction vacuum melted steel.

"Prices of these specialty materials have dropped 40 pct in five years," reports Jack Bremmer, purchasing agent for SKF Industries, Inc., Philadelphia. "As more metals manufacturers get into the field, prices will drop further. There is a downward pressure right now."

Changed Pattern—This change in buying patterns illustrates one of the many new challenges facing Mr. Bremmer and other buyers in the bearings industry. He is chief buyer for SKF, under F. E. Whyte, director of purchases.

The company has plants at Kulpsville, Shippensburg, and Altoona, Pa., as well as three in Philadelphia; a new $1 million manufacturing research and development facility at Towson, Md.; and separate branch plants at Hornell, N. Y.; Massillon, O.; Asheville, N. C.; and Los Angeles.

Most branch plant raw materials are purchased from Philadelphia. Maintenance, repair and operational supplies are bought through local vendors by the branch plants, as well as specialty production materials.

"This is one advance in our move to a centralized buying program," says Mr. Bremmer.

BREMMER: "Solving the new buying problems will be a challenge."

"Paper Boom"—SKF now buys upwards of $30 million in purchased goods and services. Mr. Bremmer reports a definite upturn in buying, "but it isn't the boom, it appears to be on paper. Small tool prices have been fluctuating, with recent slight increases. But the overall pricing picture points to 'firmness.'

"Apparently, many other manufacturers learned the same lessons we did during the last recession: We have positioned our inventories and are looking at them more closely. We're buying more, but more cautiously."

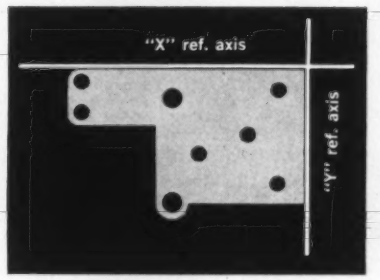
Vacuum Stress — All bearings makers are stepping up their vacuum melted steel buying, he feels. Demand is mounting for rolling contact bearings for jet aircraft, nuclear submarines, missiles, computers and new radio telescopes.

"Prices are a big factor here," he says. "But as more get into the field, the more prices will drop. Vacuum melting has decreased the severity and frequency of non-metallic inclusions in domestic anti-friction bearing steels such as 52100, which we use extensively. Improvement has already been noted in initial inspection of material, final inspection of parts, and endurance-life testing."

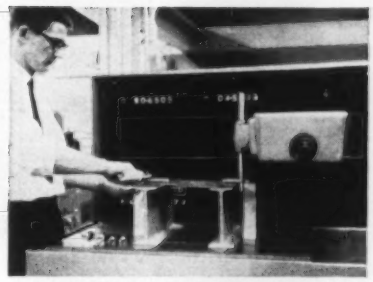
Good Results—Tests at SKF have rejected but a meager amount of consumable electrode melted bars or billets at raw material inspection. In addition, acceptance limits for non-metallic inclusions in the finished product were reduced.

"Space is opening a whole new market for bearings manufacturers," notes Mr. Bremmer. "Solving the problems will be a challenge demanding new buying techniques to match the advances."

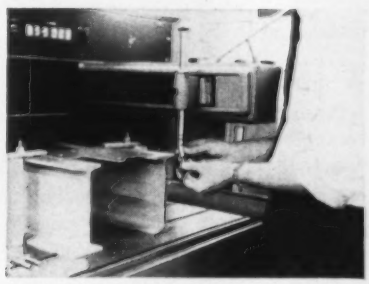
Sheffield Ferranti FI-22 locates holes to within .001″ faster than you can read this



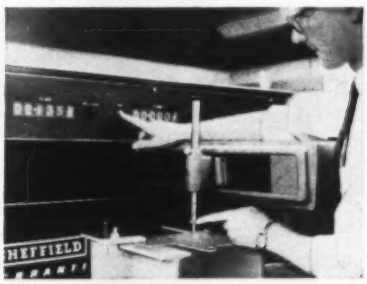
1. The problem: locate the holes in this piece to within .001". Here's how it works.



2. Mount and clamp workpiece to table. Working range of table is 15" by 24".

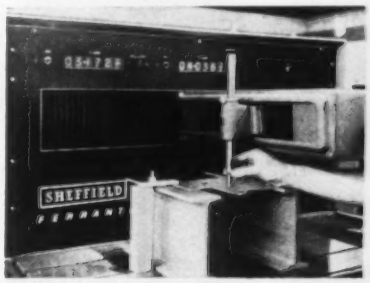


3. Insert flat probe for aligning and locating reference edges of work piece.



4. Move spindle along "X" axis until probe touches reference edge, and push zeroing button. Repeat for "Y" axis.

5. Replace flat probe with suitable tapered probe. Interchangeable tips available for a wide range of hole sizes.



6. Move spindle over piece, and lower probe into hole. Numerals in readout panels will indicate exact hole position to .001".

You can see why the FI-22 is up to ten times faster than conventional surface plate and height gage inspection. On top of that, you can use it for layout scribing and center-punching. Write for Bulletin FI-22X and ask your Sheffield representative where you can see a demonstration of this machine.

The SHEFFIELD Corporation Dayton 1, Ohio

A subsidiary of The Bendix Corporation

Inspection Gages, Dimensional Control Instruments, Machine Controls, Automatic Gaging & Assembly Systems, Measuray® X-Ray Thickness Measuring, Crushtrue® & Multiform® Grinders, Cavitron® Ultrasonic Machine Tools, Press-Pacer® Transfer Units, Large Dies, Tooling, Contract Manufacturing.

Customer Plans Keep Mills Guessing

While demand inches upward, producers are still struggling to find out how much buyers will want—and when.

Deliveries reflect the confused market with some extended and others still short.

■ Steel buyers are keeping mills guessing about fourth quarter demand. Producers find it difficult to estimate booking for many reasons. In some cases users wait as long as possible before placing tonnage. Other confusing factors in the market: Uncertainty about auto steel tonnages, the seasonal slowdown in construction and tinplate markets, and guessing when buyers will begin stepping up inventories.

Varied Deliveries — In addition, there's wide variation in delivery schedules, depending on the product and the market.

An example is the situation in galvanized sheets. Many mills are booked through November, some are quoting mid- or late-December. At least one producer has placed large coils of galvanized on allotment. Deliveries of other coated sheets are also moving out.

Yet, at the same time, deliveries of cold-rolled sheet, the base stock for coated products, are only three to four weeks for many mills. Hot-rolled sheet is available in some cases in only two weeks.

Salesmen Vexed — Plate offers another example of the wide difference in product deliveries. While alloy plate and plate specialty products are in good demand, carbon plate orders for November are coming in slowly to mills. Plate rolled on strip mills can often be obtained in about two weeks.

This wide gap in deliveries is vexing steel sales personnel. Typical is the reaction of one Midwest sheet salesman: "We're still advising customers to begin a little inventory building. But they continue to point out they can get cold-rolled sheet in three or four weeks. Actually, deliveries range from three weeks to three months and purchasing men refuse to be concerned."

Sheet and Strip—Mill opinions on November sheet and strip tonnage vary. Some say November will be above October, others say not. November orders are generally good, but bookings are coming in slowly. Some **East Coast** mills were still looking for November cold-rolled orders near the end of October. **Pittsburgh** mills say sheets are showing a slight improvement, but no major change. One mill there says November bookings will be up or down from October, depending on how much auto industry tonnage is placed late in the month.

Detroit-area mills believe the fourth quarter will be good, but not as great as expected earlier. Auto plants are now consuming steel at a fast rate. Future steel buying will depend on car sales and auto inventories at the dealer level. Generally, there's no great pressure from automakers for steel. A few orders are even coming in with the notation, "Deliver January, not before."

Plates and Shapes—Lack of any real push is keeping this market from moving up sharply. **Eastern** mills say construction steel orders are mainly for small-sized jobs requiring limited tonnages. However, one structural mill reports September was the best month in the last eighteen and October looks as strong.

At **Pittsburgh,** demand for plates and shapes shows little change. Heavy plates are still the best product. Light plates are relatively weak and standard structurals are lagging.

Further west, **Chicago** area buyers say deliveries on wide plate have eased. However, the situation is mixed. Deliveries on some intermediate plate sizes have stretched out, largly because of mill production problems. Narrow plate, rolled on strip mills, can be shipped in about two weeks. Universal mill plate is readily available.

Structural mills are operating at about 75 pct of capacity. But mills are discouraged because the approaching slow weather will cut down building activity, and because fabricators are reluctant to build inventories.

However, as of Sept. 30, the backlog for fabricated structurals was 2.7 million tons, according to the American Institute of Steel Construction. Of this, about 1.4 million tons, or more than 50 pct is sheduled for fabrication before the end of January. Bookings of fabricated structurals jumped to 408,000 tons in September, the Institute notes, concluding the best third quarter since 1955.

Bar—Orders remain at the level of the last few months along the **East Coast,** without any strong signs of improvement. The market is stronger in the **Midwest** where both hot-rolled and cold-finished bar are making gains.

PURCHASING AGENT'S CHECKLIST

Electronics makers seek more stable, non-defense market for semiconductors. P. 44

New machine tool orders hit highest monthly total since March, 1957. P. 59

All-out approach is best way to solve reliability and quality control problems. P. 69

COMPARISON OF PRICES

(Effective Oct. 30, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Oct. 30 1961	Oct. 23 1961	Oct. 2 1961	Nov. 1 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Oct. 30 1961	Oct. 23 1961	Oct. 2 1961	Nov. 1 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.11
Foundry, South Cin'ti.	71.92	71.92	71.92	71.92
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	69.61
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. Cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig Iron	$66.44	$66.44	$66.44	$66.32
Scrap: (ton gross ton)				
No. 1 steel, Pittsburgh	$33.50*	$36.50	$37.50	$26.50
No. 1 steel, Phila. area	37.50*	39.50	40.50	32.50
No. 1 steel, Chicago	32.50*	37.50	39.50	25.50
No. 1 bundles, Detroit	29.50*	32.50	34.50	21.50
Low phos., Youngstown	37.50*	39.00	42.00	27.50
No. 1 mach'y cast., Pittsburgh	45.50	45.50	45.50	45.50
No. 1 mach'y cast. Phila.	48.50*	49.50	49.50	48.50
No. 1 mach'y cast., Chicago	44.50*	47.50	50.50	41.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$34.50*	$37.83	$39.17	$28.17
No. 2 bundles	24.17*	25.17	26.17	18.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper electrolytic, Conn.	$31.00	$31.00	$31.00	$30.00
Copper, Lake, Conn.	31.00	31.00	31.00	30.00
Tin, Straits, N. Y.	121.875†	120.25**	122.00	104.00
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	24.00	24.00	24.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

THE 5210 HOUSE

PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

INDEX TO PRICE PAGES

Prices At a Glance	105
Comparison of Prices	109
Bars	116
Billets, Blooms and Slabs	114
Boiler Tubes	120
Clad Steel	120
Coke	119
Electrical Sheets	120
Electrodes	120
Electroplating Supplies	120
Fasteners	118
*Ferroalloys	
Iron Ore	118
Merchant Wire Products	118
Metal Powders	120
Nonferrous	
Mill Products	113
Primary Prices	109, 112, 113
Remelted Metals	113
Scrap	113
Piling	114
Pig Iron	118
Pipe and Tubing	119
Plates	116
Rails	120
Refractories	120
Service Center Prices	117
Shapes	114
Sheets	115
Spring Steel	120
Stainless	118
Steel Scrap	111
Strip	114
Structurals	114
Tinplate	115
Tool Steel	118
Track Supplies	120
Water Pipe Index	119
Wire	116
Wire Rod	115

*Appears in the Oct. 26-Nov. 9 issue.

INDUCTION CONSUMABLE LEADED

PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

Market Plunges To New Lows

Scrap prices fell for the fifth straight week, to the lowest levels since February.

Demand is running far below expectations. Biggest price drops were in Chicago and Pittsburgh.

■ The scrap market broke this week. And there are signs the bottom is not yet in sight. Export, too, is weakening.

At Chicago, the market suffered its sharpest price decline in modern scrap history. An automotive stampings plant sold No. 1 industrial bundles nearly $10 a ton under last month's price. Other major industrial lists were off $7 from going levels. No. 1 grades were off a full $5.

At Pittsburgh, No. 1 factory bundle grades sold for $4 to $5 under last month's levels.

The new drops at major scrap centers reflect dried up mill demand and faltering export orders. Steelmakers are using more hot metal and cutting their scrap buying. Government-enforced slowdown has cut into Japan's scrap buying power.

Most dealers report an unfavorable outlook for the rest of the final quarter. Steelmaking production pace has been disappointing and until it picks up again, scrap market will continue to weaken.

The Iron Age composite price for No. 1 heavy melting dropped $3.33 to $34.50, from $37.83, with price cuts in Pittsburgh, Chicago and Philadelphia. No. 2 bundles composite price dropped to $24.17, from $25.17.

Pittsburgh—The market has gone into a nosedive, with industrial prices paving the way. On a local list, No. 1 factory bundles sold for $4 to $5 under last month's levels. This drop forced prices of No. 1 heavy melting and low phos. grades down. Secondary openhearth grades shared in the general weakness. These were already close to bottom, but some price losses were expected. One local mill has dropped its price for No. 2 bundles to $26.

Chicago—The worst price break in years hit Friday with major industrial lists off $7 from going price levels. A trickle of short sales began early in the week. But the break was bad enough to throw the market into confusion at week's end, and dry up scrap while suppliers hunted for a new price level. Mill offers for No. 2 grades met opposition at $5 under last week's levels. No.1 grades slid a full $5.

Philadelphia—Prices dropped at least $2 in No. 1 steelmaking grades as this market continues definitely weaker. One mill widened its price spread between No. 1 heavy melting and No. 2 from $4 to $6. Demand at the mill level remains weak and export is bogging down again, after months of steady orders and shipments. Prices are back to the February level.

New York—The impact of the falling scrap market inland reached this area in a hurry. Export buyers quickly slashed their orders, and prices. Several of the biggest dealers completely left the market. Net result: Steelmaking grades down $2.

Detroit — The dealer market broke sharply downward following the shellacking industrial scrap took on the November lists. Mill buying is small, exporters a minor factor. Big question: Where the market will drift from here. Key factors are if and when exporters come back in, and when GM and Ford will shave car production.

Cleveland—Market dropped another $1.50 in Cleveland, and $1 in the Valley, on dealer grades. Prices broke under pressure of 26,000 tons of auto production scrap. Auto lists went for about $35 tops on track and a major part will likely go out of the district. Mills are still not interested due to excess hot metal and weak market conditions.

Cincinnati—Market is down $1 and may drop farther. Local production list will take care of one major area consumer and another one is expected to take less than normal tonnage.

St. Louis—Market here is leaning toward the weak side. Mills are very restrictive in their buying. No large movements at present prices and market is flooded.

Birmingham—Market here is almost at a complete standstill. Brokers cut quotations on heavy melting grades and further cuts are expected.

Buffalo — Dealers are marking time in a weak market. November mill orders hold the key. Forecast is not good, however, and further price cuts seem likely.

Boston—No price changes, but downward pressure on prices continues. Export has tapered off to very little and domestic trade is growing weaker.

Houston—Market is quiet with pressure toward lower prices.

West Coast—As predicted, prices dropped in Los Angeles, San Francisco and Seattle. And they're still weak. Mill buying is dormant, but dealers look for them to come into the market in December.

SCRAP PRICES *(Effective Oct. 30, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	34.00 to 35.00
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate	42.00 to 43.00
Heavy turnings	29.00 to 30.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	51.00 to 52.00
RR specialties	44.00 to 45.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	41.00 to 42.00
Low phos. punch'gs plate, ¼ in. and heavier	39.00 to 40.00
Low phos. 2 ft and under	37.00 to 38.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	54.00 to 55.00
Rails 2 ft and under	45.00 to 46.00
Angles and splice bars	40.00 to 41.00
RR steel car axles	53.00 to 54.00
RR couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	37.00 to 38.00
Cast iron wheels	33.00 to 34.00
Malleable	42.00 to 43.00
Stove plate	31.00 to 32.00
Steel car wheels	38.00 to 39.00
Stainless	
18-8 bundles and solids	165.00 to 170.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	80.00 to 85.00
430 turnings	45.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	40.00 to 41.00
Low phos. 2 ft punch'gs	42.00 to 43.00
Elec. furnace bundles	40.00 to 41.00
Heavy turnings	27.00 to 28.00
RR specialties	43.00 to 44.00
Rails, 18 in. and under	51.00 to 52.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	40.00 to 41.00
Malleable	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	40.00 to 41.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	29.00 to 30.00
Drop broken cast.	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$35.50 to $36.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	21.00 to 22.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	32.50 to 33.50
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	32.50 to 33.50
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	37.00 to 38.00
Low phos. punch'gs plate	33.50 to 34.50
Drop forge flashings	32.50 to 33.50
Foundry steel, 2 ft & under	31.50 to 32.50
No. 1 RR hvy. melting	36.00 to 37.00
Rails 2 ft and under	45.00 to 46.00
Rails 18 in. and under	46.00 to 47.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	42.00 to 43.00
No. 1 machinery cast.	43.00 to 44.00
Stove plate	37.00 to 38.00
Malleable	48.00 to 49.00
Stainless	
18-8 bundles	160.00 to 165.00
18-8 turnings	95.00 to 100.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structural and plate, 2 ft and under	39.00 to 40.00
Rails 2 ft and under	50.00 to 51.00
Scrap rails, random lgth.	40.00 to 41.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
Foundry steel, 2 ft.	29.00 to 30.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.50 to 15.50
Shoveling turnings	16.50 to 17.50
Cast iron borings	22.00 to 23.00
No. 1 RR hvy. melting	35.00 to 36.00
Rails random lengths	39.00 to 40.00
Rails, 18 in. and under	44.00 to 45.00
RR specialties	40.00 to 41.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	31.00 to 32.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	42.00 to 43.00
Structural and plate, 2 ft.	41.00 to 42.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	44.00 to 46.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	40.00 to 41.00
Stove plate	40.00 to 41.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	29.00 to 30.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	15.00 to 16.00
Mixed bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	27.00 to 28.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	30.00 to 31.00
Automotive cast.	41.00 to 42.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.50 to $29.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	28.50 to 29.50
No. 2 bundles	18.00 to 19.00
No. 1 busheling	28.50 to 29.50
Machine shop turn.	4.00 to 5.00
Shoveling turnings	9.50 to 10.00
Clean cast. chem. borings	17.50 to 18.50
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	30.00 to 30.50

San Francisco

No. 1 hvy. melting		$38.00
No. 2 hvy. melting		33.00
No. 1 dealer bundles		29.00
No. 2 bundles		23.00
Machine shop turn.		15.00
Cast iron borings		15.00
No. 1 cupola cast.		50.00

Los Angeles

No. 1 hvy. melting		$38.00
No. 2 hvy. melting		33.00
No. 1 dealer bundles		29.00
No. 2 bundles		23.00
Machine shop turn.		15.00
Shoveling turnings		15.00
Cast iron borings		15.00
Elec. furnace 1 ft and under (foundry)		46.00
No. 1 cupola cast.	47.00 to	48.00

Seattle

No. 1 hvy. melting		$38.00
No. 2 hvy. melting		33.00
No. 2 bundles		23.00
No. 1 cupola cast.		36.00
Mixed yard cast.		31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting		$30.00
No. 2 hvy. melting cut 3 ft and under		27.00
No. 1 dealer bundles		31.00
No. 2 bundles		23.50
Mixed steel scrap		22.00
Bush., New fact., prep'd.		30.00
Bush., new fact., unprep'd.		24.00
Machine shop turn.		8.00
Short steel turn.		12.00
Mixed bor. and turn.		12.00
Cast scrap		32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting		$35.00
No. 2 hvy. melting		32.00
No. 2 bundles		22.00
Machine shop turn.		12.00
Shoveling turnings		15.00
Cut structural plate 2 ft & under	$44.00 to	45.00
Unstripped motor blocks	28.00 to	29.00
Cupola cast.	36.00 to	37.00
Heavy breakable cast.	28.00 to	29.00

Brass Mill Sales Reach Plateau

A survey of the brass mill industry indicates business has reached a plateau now.

The pickup has been steady all year. But sales are not likely to go higher the rest of the year than they are now.

■ "Sometimes it's a little frustrating," says the president of a major brass mill. "It doesn't seem to matter whether I am in the office or not. No matter what I do, business seems to drift along at about the same pace."

This executive confirms what a survey of the brass industry indicates: Business has very definitely hit a plateau. And it's not likely to go much higher this year.

Slow Pickup—Business had been picking up slowly since late spring. But as of October orders, the improvement has leveled off.

Brass mill officials are optimistic. They feel that this is a natural breathing point. Consensus is that business will start moving up again after the first of the year.

Meanwhile, the slowdown is taking the zing out of 1961. Now it appears that it will be nip and tuck as to whether orders in 1961 will top 1960.

Auto Drawback—While business isn't moving ahead as most had hoped, it isn't bad. Mills concede they are disappointed in the volume from auto buyers. The same situation applies to other major markets —such as building and appliance.

The other discouraging fact is that December has come to rival summer as a soft sales period. Customers in large numbers have apparently adopted bookkeeping methods which feature very low inventories at the end of a fiscal period.

Heads of several mills expect December shipments to be almost as bad as July and August.

Final Outlook—With the October order pattern set, and the picture for November rapidly taking shape, brass mill officials are in excellent positions to estimate the final quarter.

Bright spot: Brass customers have made no attempts through 1961 to build inventories. Mills point out that speedy delivery is a must to get many orders.

Brass mills can see no shortages ahead. But they say if business starts to climb again next spring, it will likely extend deliveries. Worst that can happen is that shipments will match consumption. And there is always the chance that some inventory rebuilding will emphasize the pickup.

Copper

Last week Anaconda American Brass Co. exposed its top research brass to questioning on the chances for stainless copper. Opinion still varies.

G. C. Strubell, administrative director of metallurgy and research, figures it is "just a matter of time."

But David Thompson, head of the chemical metallurgy div., can "never see copper-colored alloy as passive as stainless steel."

And opinions of other top research men in the company range widely between these views.

New Markets—Anaconda president Richard Stewart says he is convinced of the more than adequate supply of copper for the years to come. But he feels the industry could run into real trouble unless new uses and markets are discovered.

Anaconda was one of the first copper companies to open a successful research program. New ideas for products and processes are still coming, Mr. Stewart says.

Aluminum

A survey of aluminum products for 1961 by the National Assn. of Aluminum Distributors is highly optimistic.

NAAD members figure sheet, plate and coil business will be almost 13 pct better than last year; wire, rod, bar and structurals about 5 pct better; tubing about 8.1 pct better; and extrusion and pipe, 3.2 pct improved.

The industry is counting heavily on fourth quarter business to put 1961 over 1960.

Tin Prices for the Week

October 24—120.50; October 25 —121.25; October 26—121.75; October 27—121.75; October 30 —121.875*.

* Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	24.00	26.00	9/25/61
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 113.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)
("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	47.4	46.4	45.4	44.4
5052	54.8	52.0	49.8	46.8
6061-0	53.0	50.3	48.4	47.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 3/8
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated
(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.99

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb. f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb cont'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb) ..$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz. ...$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz. ..$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per pg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
- 0.30 copper max. 23.25-23.75
- 0.60 copper max. 23.00-23.50

Piston alloys (No. 132 type) ..25.00-26.00
No. 12 alum. (No. 2 grade) ..21.25-21.75
108 alloy 21.75-22.25
195 alloy 24.25-24.75
13 alloy (0.60 copper max.) ..23.00-23.50
AXS-679 (1 pct zinc) 21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 22.75-23.75
Grade 2—92-95% 21.50-22.50
Grade 3—90-92% 20.50-21.50
Grade 4—85-90% 19.50-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24⅜	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27¼
- No. 2 copper wire 25¼
- Light copper 23
- *Refining brass 24
- Copper bearing material 23

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27¼
- No. 2 copper wire 25¼
- Light copper 23
- No. 1 composition 24½
- No. 1 comp. turnings 24
- Hvy. yellow brass solids ... 18½
- Heavy yellow brass turnings 17½
- Radiators 20

Aluminum

- Mixed old cast. ..... 12 —12½
- Mixed new clips ..... 14 —14½
- Mixed turnings, dry ..... 13 —13½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 23½—24
- No. 2 copper wire ..... 21½—22
- Light copper ..... 19¼—19¾
- Auto radiators (unsweated) . 16¼—16½
- No. 1 composition ..... 20½—21
- No. 1 composition turnings .. 20 —20½
- Cocks and faucets ..... 16¾—17¼
- Clean heavy yellow brass ... 14¼—14¾
- Brass pipe ..... 16½—17
- New soft brass clippings .... 18¼—18¾
- No. 1 brass rod turnings .... 16 —16½

Aluminum

- Alum. pistons and struts .... 7 — 7½
- Aluminum crankcase ..... 9½—10
- 1100 (2s) aluminum clippings 11⅜—12¼
- Old sheet and utensils ..... 9½—10
- Borings and turnings ..... 4½— 5
- Industrial castings ..... 9 — 9½
- 2020 (24s) clippings ..... 10½—11

Zinc

- New zinc clippings ..... 5 — 5¼
- Old zinc ..... 3 — 3¼
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1¾— 2

Nickel and Monel

- Pure nickel clippings ..... 56 —58
- Clean nickel turnings 43
- Nickel anodes ..... 56 —58
- Nickel rod ends ..... 56 —58
- New Monel clippings ..... 26 —26½
- Clean Monel turnings ..... 18½—19
- Old sheet Monel ..... 25 —25½
- Nickel silver clippings, mixed. 20
- Nickel silver turnings, mixed. 17

Lead

- Soft scrap lead ..... 7¼— 7½
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 30 —32
- No. 1 pewter ..... 65 —67
- Auto babbitt ..... 46 —47
- Mixed common babbitt ..... 10 —10½
- Solder joints ..... 15 —15½
- Small foundry type ..... 9 — 9½
- Monotype ..... 9¼— 9⅝
- Lino. and stereotype ..... 8½— 8¾
- Electrotype ..... 8 — 8¼
- Hand picked type shells .... 5¾— 6¼
- Lino. and stereo. dross ..... 1¾— 2¼
- Electro dross ..... 2½— 3

(Effective Oct. 30, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *B3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras

(Effective Oct. 30, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Coke^ 1.25-lb. base box	Electro^^ 0.25-lb. base box	Thin 0.25 lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.76 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ^ COKES: 1.50-lb. add 25¢. ^^ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb., 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3, Y1.*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Oct. 30, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*		7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, W13*		9.025 *A5, C13,W13*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,W13*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Oct. 30, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
W13 Western Cold Drawn Steel, Div. of Standard Screw Co., Elyria, O.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.36	10.16	11.35	9.70	9.95	9.75	11.80	17.48	16.48	21.58	20.83
Birmingham		9.11	11.00	11.39	10.10	9.06	9.12	8.91	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.02	10.50	11.62	12.50	9.93	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.48	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	8.00	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.63	12.85	18 59	16 68	22 69	21 04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.59
New York**	.10	10.17	10.88	11.45	12.47	10.32	11.00	10.54	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.60	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.68	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.85	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64	.....	16.69	21 79	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅛" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier: [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Oct. 30, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Oct. 30, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25-26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00-31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	42.25	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25-29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R5;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown. *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1:* Claymont, Del; *P2.*

Forging billets: Ambridge Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Am'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Chicago *W7*	173	...	...	...	...	9.00	9.55†
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2***	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
SparrowsPt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.70
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

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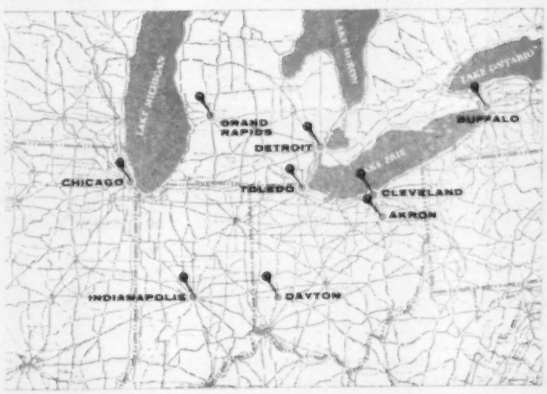

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RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *Ul*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *Ul*	5.75	.....	.....	.....	6.875	.....
Huntington, *Cl6*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *Ul*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	7.025	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	9.10	.....	.....	.....	.....
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

- Rolled elliptical, 18 in. or longer, 5000 lb lots 44.50
- Electrodeposited, 5000 lb lots.... 37.50
- OFHC anodes, 3 in. diam. (5000 lb) 42.50

Brass, 80-20, ball anodes, 2000 lb or more 51.50

Zinc, ball anodes, 2000 lb lots 18.25
(for elliptical add 1¢ per lb)

Nickel, 99 pct plus, rolled carbon, 5000 lb 1.05
(Rolled depolarized add 3¢ per lb)

Cadmium, 5000 lb 1.60

Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90

Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45

Nickel sulfate, 5000 lbs 31.00

Nickel chloride, freight allowed, 100 lb 47.50

Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums.... 25.80

Zinc cyanide, 100 lb, N. Y. 61.50

Potassium cyanide, 100 lb drum Chicago, del'd east of Rockies... 46.50

Chromic acid, flake type, 10,000 lb or more, N. Y. 30.94

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R.	11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots	25.75
Carbonyl Iron (200 lb lots)	88.00
Welding Grades	8.10
Cutting and Scarfing Grades	9.85
Hydrogen reduced, domestic	11.25

Copper Powders

Molding Grades	
Electrolytic, domestic, f.o.b. shipping point.	15.00†
Atomized	44.3 to 62.3
Reduced	15.00†
Chemically Precipitated	45.5
Brass, 5000-lb lots	33.1 to 50.3
Bronze, 5000-lb lots	51.5 to 56.8
Chromium, electrolytic	5.00
Lead	7.50†
Manganese, electrolytic ...	$1.00
Molybdenum	$3.60 to $4.35
Nickel	$1.15
Carbonyl Nickel, 20,000 lb lots	$1.01
Nickel-Silver, 5000 lb lots..	56.0 to 68.0
Silicon	70.00
Solder	7.00†
Stainless Steel, 316	$1.07
Stainless steel 304	89.00
Tin	15.00†
Titanium, 99.25 + pct, per lb, f.o.b.	$11.25
Tungsten, carbide grades...	$3.25
Zinc	19.5 to 32.7

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*Ul*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	39.75
	316	42.20	46.25	50.25	58.25
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, $43.85; 1 side, $36.60.

(Effective Oct. 30, 1961)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., K.	$185.00
High duty (except Salina, ., add $5.00)	133.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk...	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays	163.00
Chicago District	168.00
Western Utah	183.00
California	185.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O.	163.00-168.00
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union, Pa.	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md.	$620.00
Gary, Ind.	658.50
Standard, Pascagoula, Miss.	647.50
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Baltimore	585.00

Magnesite Brick

Standard, Baltimore	$715.00
Chemically bonded, Baltimore	655.00
Chemically bonded, Pascagoula, Miss.	682.50

Grain Magnesite

St. ⅜ to ½-in. grains

Per net ton

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b., Pascagoula, Miss...	80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
Ohio Seamless Tube	3	12	62.62	73.40	55.59
Div., Copperweld Steel Co.*	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.

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10 Ton 61' Span 230V DC
10 Ton 52' Span 230V DC

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2—10" Dia. x 10"/16" Face 2-Hi Cold Mills with 40/65 H.P. Motors 230 volts DC. Edge Rollers, Collers, etc.—complete.

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168 CFM	100 psi	7 x 7 Ing.—CPT—Worth
185 CFM	150 psi	7 x 7 Joy WG9.
234 CFM	100 psi	9 x 9 Ing.—Worth Chic. Penn.
306 CFM	100 psi	9 x 7 Joy WG9.
368 CFM	100 psi	12 x 10 Ing. Rand ERI
405 CFM	100 psi	12 x 11 IR—Worth—CP
528 CFM	100 psi	14 x 12 Ing. Rand ERI
502 CFM	125 psi	12 x 13 Ing. Rand. Worth.
676 CFM	110 psi	15-9¼ x 12 IR-XRE 125 HP Syn. 3-90-220-440
836 CFM	100 psi	14 x 13 IR. Worth HB
895 CFM	125 psi	17-10 x 12 Ch. Pn. OCE. 150 HP 3-90-2300 Syn.
877 CFM	125 psi	17/10½x14—IR—XRB.
980 CFM	125 psi	18-11 x 10 Ch. Pn. V-CE 150 HP Syn. 3-60-440/2300 200 HP G.E. Syn. 3-90-4160
2200 CFM	110 psi	26-15 x 18 CP—OCE. 350 HP Syn. 3-60-4600
2230 CFM	110 psi	25-15 x 12 Ing. Rand XVH. 350 HP G.E. Syn. 3-90-440

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Outside Buys Pace Chicago Gains

Used machinery sales continue to advance in Chicago.

Out-of-area orders are pacing the pickup, however. Many local buyers are still "shopping."

■ As in September, there are signs that Midwest used machinery sales are advancing. But the pace is not rapid. Several factors are clouding the picture.

Most unusual is the frequently heard report that sales in the immediate Chicago area are lagging behind the influx of out-of-area orders. Dealers with a heavy part of their sales geared to the metropolitan Chicago marketing area complain they are getting far more inquiries than orders. But substantial shipments have been made or are on order for delivery to the South, Southwest, and West Coast markets. Even Wisconsin buyers have been active in the past week.

Much Shopping — Second factor that is making it tough for used tool men to assess their own market area: The vast amount of shopping that is being done, with orders that the equipment is not going to be purchased until after January 1.

Usually this is couched as the comment: "We're shopping now; we're open to listening to what you regard as a fair price; but we are not going to conclude any purchases for at least another 60 days."

It means that some buyers, and this is believed to include some large purchasers, have a keen eye on the tax picture, and on the possibility of tax revisions in 1962 which would cover purchases made then.

Gains Expected — The Chicago picture, when the smoke clears away, will have registered some worthwhile gains in October.

For example: In a shop handling a relatively high proportion of light equipment, sales began inching up about 45 days ago. As October opened this pace quickened. And the current rate will make October equal to some of the gains early this year.

There is enough activity among small tool buyers to suggest that they are speeding up, rather than slowing down, their rate of purchase.

Out-of-area sales have been largely production equipment. Heavy lathes figured in several new orders, along with milling and multiple drilling equipment.

Heavy Holdup — If Chicago is holding back at all, it's in the heavy equipment area. Actually sales of production equipment are not yet in the volume that lighter equipment has reached in recent weeks. But heavy equipment is drawing the most inquiries.

Despite this, production equipment has shown some gains. They do not appear to be as strong as the business gains in other markets, but they are definite.

Slow Payments—Collection continues to run slow, with even big buyers slow to pay up. On the other hand, the price firming reported in September is still in evidence. There's every reason to expect prices to hold at present levels, or to advance in the near future.

A new note that appeared in the past week: Foreign tool sales, after a very slow summer, began perking up slightly.

CHECK THIS LIST OF HIGH GRADE USED TOOLS

AUTOMATIC, 7½" No. 675 New Britain Gridley, 6 spdl. chucker
BORER, No. 321 Heald, hyd., single end, new '54
BROACH, 10 ton 96" stroke, Mod. 10-66SRV La-Pointe, hyd.
COILER, Cleveland cradle type, 50"-72" wide, MD
DRILL, 22" No. 221½ Barnes box col., all grd. tapping, '52
DRILL, HORIZ. Allen 2-way opposed, new '58
DRILL DRIVER, No. 15½ Foote Burt vert., hyd., (2)
DRILL, RADIAL, 6'-17" Cincinnati Bickford, super-service (2)
DRILL, Hartford Special 3-way index drill & bore, '54
GEAR GENERATOR, 1-61" No. 5B Sykes/Farrell/-Birmingham herringbone MD, 38 to 42 (3)
GRINDER, CENTERLESS, No. 4 Cincinnati
GRINDER, CYLINDRICAL, 22" x 72" Landis Type C
GRINDER, INTERNAL, No. 24-36 Bryant hyd., (3)
GRINDER, SURFACE, 30" Model 18 Blanchard rotary, MD, '41
GRINDER, Type HRS Barber Colman hob cutter and reamer
GRINDER, Springfield, Mod. 2TR vert. univ., 25", 7½ HP, new '52
HONE, Mod. 224 Barnes, vert. int., hyd., '43
KEYSEATER, No. 3 Baker Bros. 5 HP MD
LATHE, AUTOMATIC, Mod. 3D Gisholt Simplimatic, '41
LATHE, ENGINE, 36" x 12' cc Wickes hy. dy. grd. bd. QCG.
LATHE, PROD. 15" x 30" cc Lipe Carbomatic, hyd.
LATHE, TURRET, No. 2L Gisholt univ., saddle, '40
LATHE, Mod. 10 x 72" Sundstrand center drive, auto., '47
MILL, PROD., No. 33 Sundstrand "Fluidsrew Rigidmil"
MILL, 4" bar Univ. "Tri-Way" table type
MILL, PLAIN, No. 4 "Dual Power," Cincinnati 30 HP, hy. dy. '51
MILL, THREAD, No. 3 Plan-O-Mil, planetary
PLANER, 42" x 42" x 14' Cincinnati dbl. hsg.
PRESS, COINING, 2000 ton E. W. Bliss air eluteh, 10" str., new '51, never used
PRESS, HIGH SPEED, 125 ton No. 100 H&W auto.

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3 ton x 19'9" Shepard-Niles 1943 DC
5 ton x 45'0" Shepard-Niles AC 1945
5 ton x 45'0" P&H DC 1941
7½ ton x 107'0" Whiting AC 1949
10 ton Cantilever crane 35'0" span 1943 AC
10 ton x 28'0" Shaw-Box 1941 DC
10 ton x 45'0" Bedford 1941 DC
10 ton x 75'0" Northern 1925 AC
10 ton x 67'0" P&H 1942 DC
15 ton x 79'1" P&H 1942 DC
20 ton x 28'10" Shaw-Box DC 1948 DC
25 ton x 99'0" Leonard Burke 1943 AC

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ADVERTISERS IN THIS ISSUE

An asterisk indicates that a booklet, or other information, is offered in the advertisement.

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A

*Acme Chain Corp. 61
Alan Wood Steel Co. 104
American Air Compressor Corp. . 122
American Welding & Mfg. Co. .. 86
Anaconda American Brass Co. 51
Arcos Corp. 98-99
Armco Steel Corp. 24-25
Atlas Steels, Ltd. 100

B

Baldt Anchor, Chain & Forge Div. 124
Bay City Forge Co. 124
Belyea Co., Inc. 123
Bessemer & Lake Erie Railroad Co. 26
Bethlehem Steel Co. 1
*Black & Decker Mfg. Co. 90-91
Bower Roller Bearing Div.—Federal-Mogul-Bower Bearings, Inc. 8

C

Carco Industries, Inc. 124
Carlson, G. O., Inc. 40
Cattie, Joseph P. & Bros. Inc. .. 126
Chicago Pneumatic Tool Co. 64-65
Colorado Fuel & Iron Corp. 34-35
Columbia-Geneva Steel Div., United States Steel Corp. 22, 53
*Copperweld Steel Co., Aristoloy Steel Div. .....Inside Front Cover
Cox & Sons Co. 124
Crucible Steel Casting Co. 119
Crucible Steel Co. of America .. 6
Curry & Hudson Assoc., Inc. 122

D

Davidson Pipe Co. Inc. 123
*Dravo Corp. 18-19
Duquesne Electric & Manufacturing Co. 124
*Duraloy Co. 23

E

Erickson Tool Co. 20

G

Gardner Machine Co. 27
*Garlock Inc. 38
Gilbert Merrill Steel Corp. 124
Goodman Electric Machinery Co. 123
Goss & DeLeeuw Machine Co. ... 126
Great Lakes Steel Corp. 32-33

H

Hamilton-Electrona, Inc. 36
*Hayes, C. I., Inc. 17
Heat & Power Co., Inc. 122, 123
Hughes, Arnold, Co. 123, 124
Hyde Park Foundry & Machine Co. 62
Hyman, Joseph & Sons 123

I

Indeck Power Equipment Co. 123

J

*James, D. O., Gear Mfg. Co. .. 56

K

*Kemp, C. M. Mfg. Co. 30
Keystone Forging Co. 124
Keystone Steel & Wire Co. 93
King Foundries, Inc. 124
*Kobe Steel Works, Ltd. 103

M

*Meaker Co. Div., Sel-Rex Corp. 85
*Midvale-Heppenstall Co. 68
Miles Machinery Co. 123
Miller, Harry Corp. 12

N

National Business Bourse, Inc. ... 124
National Machinery Co. 94
National Steel Corp. 32-33
National Tube Div., United States Steel Corp. 22
New England Pressed Steel Co. .. 124
Norton Co., Abrasive Grain Div. 16

O

Ompco Products 125
Ornitz Equipment Corp. 123
Osborn Mfg. Co., Brush Div. 101

P

Pangborn Corp. 97
Pannier Corp. 84
Peninsular Steel Co. 119
Peterson Steels, Inc. 109
Phil-Good Products, Inc. 123
Pittsburgh Steel Co. 28-29
Pollock Eng. Co., Inc. 21
Pollock Industries, Inc. 123
Purdy Co. 123

R

*C. A. Roberts Co. 95
*Rolled Alloys Inc. 102
Ryerson, Jos. T. & Son, Inc. 14

S

*Sel-Rex Corp. 85
*Sheffield Corp., Subsidiary Bendix Corp. 107
Shell Oil Co. 10
Shepard Niles Crane & Hoist Corp. 63
Signode Steel Strapping Co. Back Cover
Smith, Thomas Co. 124
St. Lawrence Columbium & Metals Corp. 126
Surface Combustion Div. Midland Ross Corp. 83

T

Tennessee Coal & Iron Div., United States Steel Corp. ...22, 53
Timken Roller Bearing Co. 54
Tippins Machinery Co., Inc. 123
*Trent Tube Co., Subsidiary Crucible Steel Co. of America 6

U

*Union Switch & Signal Div., Westinghouse Air Brake Co. 31
United Engineering & Foundry Co. 37
United States Steel Corp. 22, 53
United States Steel Export Co. .22, 53
Universal Road Machinery Co. ... 125

V

Valley Steel Products Co. 124

W

Wallack Bros. 124
Warner & Swasey Co. 4
Wean Engineering Co., Inc. Inside Back Cover
Weatherly Foundry & Mfg. Co. .. 125
Weiss, B. M. Co. 124
Weiss Steel Co. Inc. 124
Wheelabrator Corp. 66
Wheland Foundry Div. 92
Whisler Equipment Co. 123
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. ..34-35
Wilcox Forging Corp. 125
Worley Steel Co. 125

CLASSIFIED SECTION

Clearing House 122-124
Contract Manufacturing 124, 125
Employment Exchange 125
Equipment & Materials Wanted . 124

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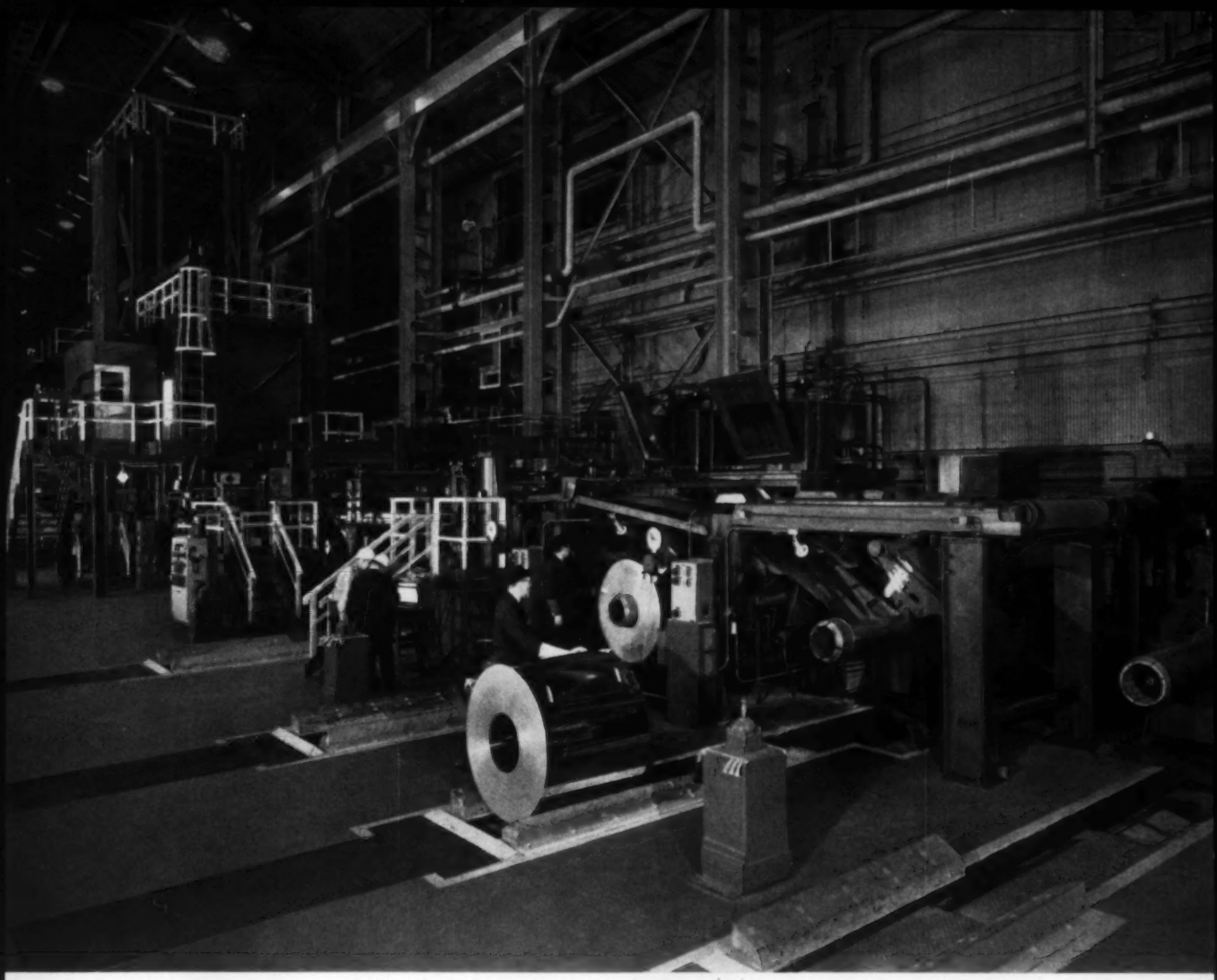

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